THE MARINE REVIEW

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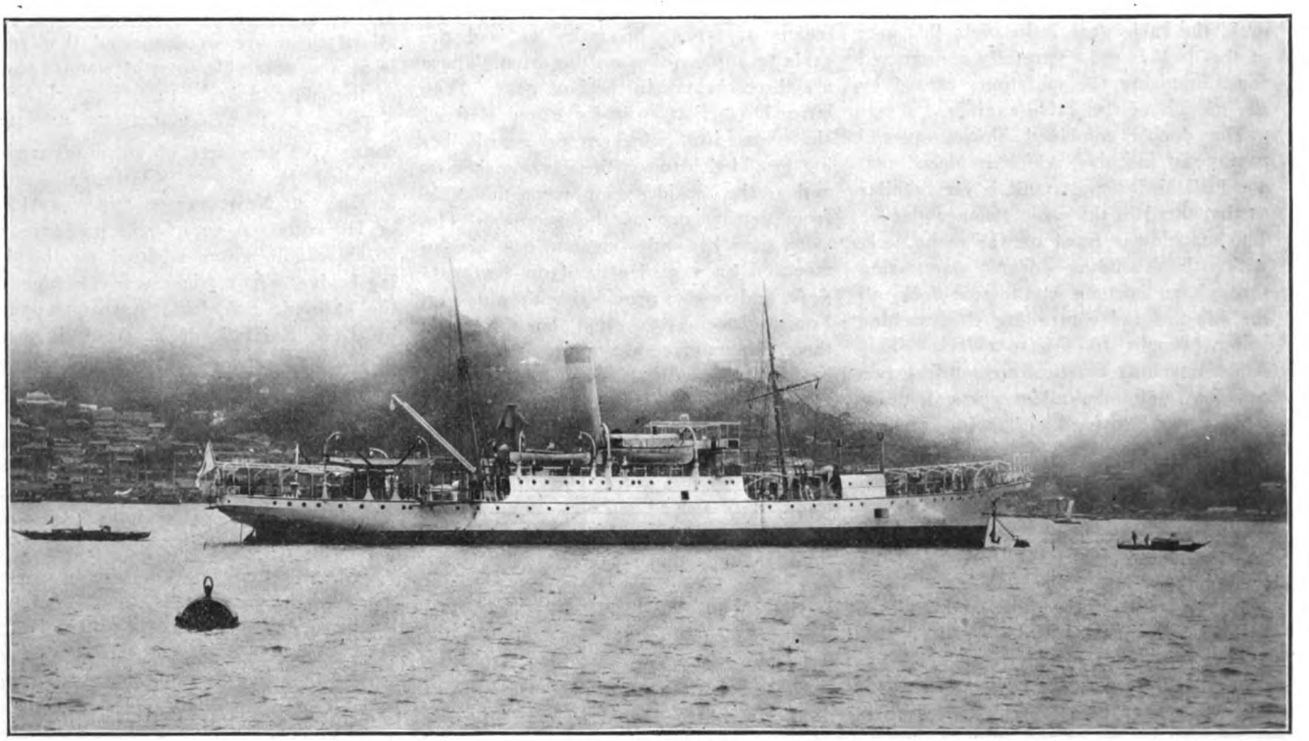
THE JAPANESE CABLE-STEAMER OGASAWARA MARU.

The cable-steamer Ogasawara Maru, which left Nagasaki on Oct. 5 last for the cable-laying work between Tsushima and Kiushiu, is the first ship of its class built in Japan. This steamer is owned by the department of communications of the Japanese goverenment, and was constructed at the Mitsubishi Dockyard Engine Works, at Nagasaki. The design of the vessel was entrusted to Dr. C. Shiba and Mr. K. Suyehiro, professors of the Engineering College of the Imperial University of Tokio; the contract was placed June 1, 1905, and the work commenced in November of the same year; the vessel being launched on June 2, 1906, six months after the laying of the keel. She is a steel spar-decked twin-screw steamer of 1455 tons gross, with engines developing 1850 indicated horse-power at full speed. The hull and machinery were constructed under the Japanese government's shipbuilding encouragement law.



CABLE SHIP OGASAWARA MARU.

The principal dimensions of the vessel are:—

	Ft.	In.
Length between perpendiculars....	240	0
Breadth, molded	34	0
Depth	22	3

The guaranteed speed was 12 knots, the ordinary sea speed expected being 11 knots. During the official speed trials the maximum speed obtained was 13.286 knots, and the average of six runs between the two measured-mile posts, three nautical miles apart, was 13.085 knots.

The hull and machinery of the vessel were all constructed by the Mitsubishi Co., except the cable gear, which was supplied by Messrs. Johnson, Phillips. of Charlton, Kent. Three cable tanks are provided in the vessel: the fore tank, of 20 ft. 6 in. diameter, intended for the storage of shore-end cables; main tank, 27 ft. in diameter; and after tank, of 23 ft. diameter. The total capacity of the three tanks gives storage for 600 tons in all of deep-sea cables. Each tank is provided with a cone at the centre for storing battens or fresh water. The hatchways of the tanks are provided with girders, carrying bell-mouth crinolines.

The structural arrangements provide two complete decks running fore and aft, and an inner bottom carried nearly the whole length of the vessel, a feature of the structure necessary in this class of vessel. The hull is subdivided into five water-tight compartments by transverse bulkheads.

The foremost cable tank, provided for the shore-end cables, is carried up to the level of the main deck, The main tank is brought 5 ft. above the main deck, leaving ample clearance between the top edge of the tank and lower side of the deck above. The bottoms of these tanks rest on the top of the inner bottom plating. The after tank is similarly constructed to the main tank, the bottom, however, resting on the top of the shaft tunnel.

The vessel is rigged as a two-masted schooner. Besides the necessary cargo appliances, the foremast is provided with yards to facilitate the lowering of buoys, etc., in cable-laying work. In front of the foremost cable tank, and on the main deck, the cable gear is located; this part of the deck is most carefully constructed for minimising the vibrations caused by the motion of the cable engines.

The double combined picking-up and paying-out machine, which is placed forward of the foremost tank, is very similar to that fitted in the cable steamer Pacific. The machine is fixed on the main deck, with the winding drums appearing through an opening in the spar-deck, all the handles for controlling the machine being brought to the spar-deck. This double machine practically comprises two complete and independent gears, both of which may be used either for picking up or paying out. This double gear is provided with two sets of steam-engines, placed fore and aft of the gear; either of the engines can drive the gear for picking up and also for paying out when the pull on the cable is moderate. When a heavy load is on the cable, both engines are put into work conjointly.

The drums can be driven at three different speeds by changing the gear-wheels by means of clutches, which action can be performed from the starting platform on the spar-deck. In the ordinary cable-laying or picking-up jobs, one of the engines may be kept as spare, since the power of one only is always quite sufficient for ordinary working. This reduces to a minimum the risk of total disablement of the gear. The cable-drums are 6 ft. in diameter by 21 in. between the flanges, and they have steel gearing-teeth and brake-rings bolted to the rims of the drums for driving and holding, the drums being arranged to run loose on the shaft. The main brakes encircling the rings attached to the drum consist of steel bands, with elm-block liners. They are made to close by means of right and left-handed screws actuated through worm-gearing from handle-wheels mounted on the stands on the starting platform. This arrangement gives very fine adjustment for the lighter load on the cable, and at the same time provides enormous holding power when necessary. To the back of each brake-strap is fitted a water-service pipe, so as to cool the rubbing surface of the elm-blocks and drum. This cooling water is supplied from an independent small steam-pump, which is arranged to be started or stopped from the starting platform. Both brakes can be coupled to each drum when an excessive load is on, and give a very powerful holding-back action to the machine.

The hauling-off and holding-back gears stand on the spar-deck, and are driven from the geared drum by means of endless chain through a friction coupling and free wheel. These gears are made to traverse across the face of the drum by means of screws, in order to lead the cable to any position on the drum. There are three sheaves in the bow gear. They have U section, run loose on a fixed shaft, cast-iron whiskers or guards being provided between the various sheaves and at the outsides to prevent the cable from getting out of the grooves. The stern gear has only one cast-iron sheave mounted on a girder fixed on the spar-deck, and is also provided with whiskers. For registering the pull on the cable three dynamometers are provided, these being fitted with Messrs Johnson and Phillips's patent arrangement of internal spring, and their maximum readings are 25 tons for picking-up purposes, and 5 tons for paying out. The usual cable leads of V-shaped sheaves, mounted on A frames, are provided fore-and-aft to the dynamometers.

The cable-engines were tried under steam outside Nagasaki Harbour. The machine wound up the load of 25 tons, consisting of bundles of anchor cables, from the bottom of water 17 fathoms deep, and at the speed of one turn per 22 seconds, which is equivalent to 1.02 knot lifting speed of cable. In this case of heavy pull the two sets of engines were used conjointly. For the purpose of turning over the cable from one tank to another, or taking in cable from outside, two sets of electric hauling gears, driven by a 6-brake horsepower motor of closed-in type, were supplied by Messrs. Johnson and Phillips; they are driven off the electric main on the spar-deck.

The propelling machinery of this vessel consists of two sets of triple-expansion engines, constructed under the Japanese government's shipbuilding regulations, 14¾ in., 24 in. and 40 in. in diameter, with a 27 in. stroke. The propellers are 11 ft. in diameter, and have each three blades of manganese-bronze.

The steam-generating plant of this vessel consists of two single-ended Scotch boilers and one donkey boiler of the Cochran type. The main boilers are 14 ft. in diameter and 11 ft. 6 in. in length, with three furnaces of 3 ft. 6 in. internal diameter for each. The flues are of Deighton's patent corrugated pattern, united to the combustion-chamber with detachable ends. The working pressure of the main boilers is 185 lb., and that of the donkey boiler 100 lb. per square inch.

One evaporator of 10 tons capacity, supplied by Messrs. Caird and Rayner, of London, is fitted, with its accessories; it is so arranged that the steam produced may be admitted to the main auxiliary condensers, and also to the intermediate-pressure receiver of the main engines.

The general service and ballast pumps are of the usual Worthington type, and all of them are so connected that each is at any time able to send water to any of the cable tanks.

The electric installation of this ship consists of two sets of steam dynamos, supplied by Messrs. Clarke, Chapman & Co., of Newcastle-on-Tyne, working at 110 volts. A searchlight projector of 16,000 candle-power is fitted on the flying-bridge. A refrigerating machine of the carbonic anhydride system, supplied by J. & E. Hall, of England, is fitted in the port wing of the engine-room, on the same seat as the steam dynamos. This machine is for cold storage and for manufacturing ice. A Kelvin sounding-machine is provided, a James submarine sentry, and also a steam-driven sounding-machine for lifting samples from the oceanbed, as usual in cable-steamers.

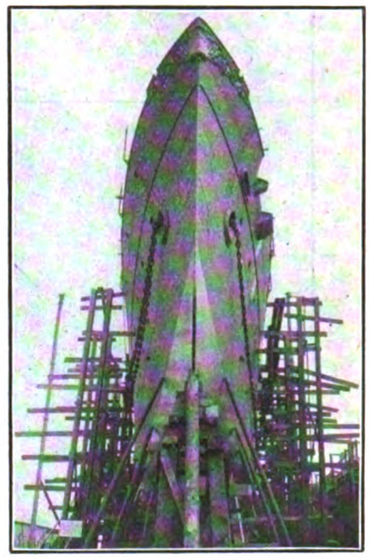
In boat equipment the steamer is provided with two sampans, two 22-ft. steel life-boats, and one steam-cutter, 30 ft. long. The steam-cutter is of the Navy type, fitted with a water-tube boiler and one set of compound engines, capable of developing sufficient power to propel the boat at 7 knots.

The Sharptown Marine Railway Co., Sharptown, Md., is constructing a freight barge for the P. Dougherty Co., Baltimore, to be a duplicate of the Pocomoke, recently built for the same owners at Elkton, Md. The barges, which are the largest on Chesapeake bay, are 210 ft. over all, 35 ft. beam and 13 ft. depth of hold, with a capacity of 2,000 tons dead-weight. They have two masts for fore and aft sails and are fitted with gasoline engines for loading and discharging, hoisting sails and pumping.

SMASHING THE BOTTLE. PRESIDENT BOWLES IS STANDING BY MISS PINNOCK, THE SPONSOR.

Scout Cruiser Salem

The First Cruiser to be Launched in the United States Equipped With Curtis Turbines.



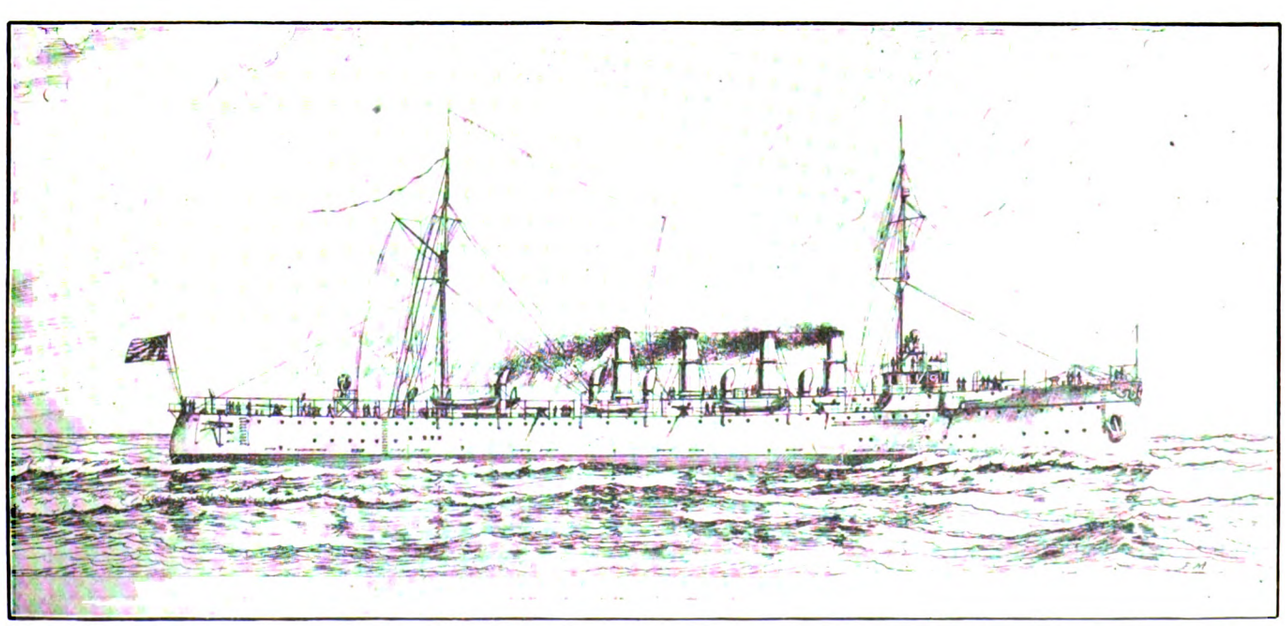
BOW VIEW, SHOWING SHARP PROW AND HIGH FREEBOARD.

The scout cruiser Salem was launched from the yard of the Fore River Ship Building Co., Quincy, Mass., on July 25, and was christened by Miss Lorna Pinnock, daughter of Mayor Thomas G. Pinnock, of Salem. The affair was of more than usual importance and was attended by thousands. The Salem is distinguished in the fact that she is equipped with Curtis turbines. Luncheon was served in the mold loft and numerous speeches were made, President F. T. Bowle, presiding.

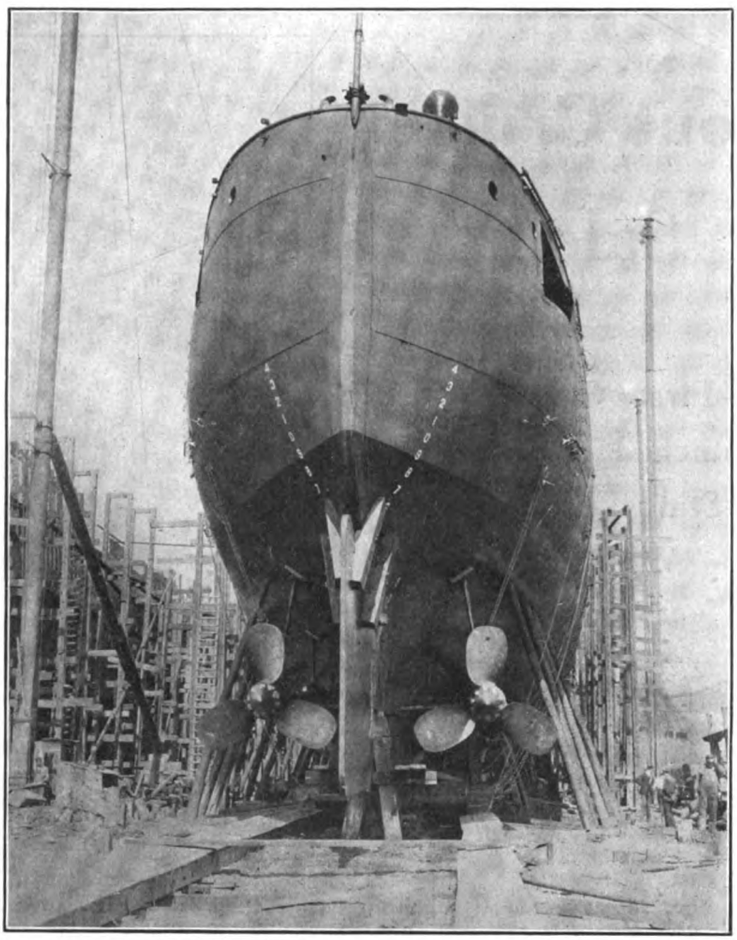
The plans and specifications for the Scout Cruiser Salem, authorized by act of Congress of April 17, 1904, cover an entirely new type, as far as the United States navy is concerned, and the various features of the design have been given the most careful consideration.

The estimated speed, 24 knots, is greater than that of any other cruiser of the navy, and is exceeded only by that of the torpedo boats and destroyers, and while it is slightly less than that of the English scouts now building, the difference in speed is more than compensated for by the ability to maintain high speed in all conditions of weather, more than twice the coal capacity of the English scouts, and, consequently, a greatly increased radius of action.

The plans as fully developed call for a vessel of the following characteristics: Length between perpendiculars, 420′ 0″; length over all, 423′ 2″; breadth moulded, 46′ 8″; draught, fully loaded, 19′ 1½″; depth amidship, moulded, 36′ 5 1/16″; displacement, fully loaded, 4640 tons; displacement on trial, 3,750 tons; draught on trial, 16′ 9½″; total coal capacity, 1,250 tons; coal on trial, 475 tons; feed water total, 100 tons; feed water on trial, 50 tons; maximum speed, average of 4 hours



THE SCOUT CRUISER SALEM AS SHE WILL APPEAR WHEN COMPLETED.—*From a drawing.*



STERN VIEW OF THE SCOUT CRUISER SALEM JUST BEFORE LAUNCHING.

run, 24 knots; steaming radius at 10 knots per hour, about 6,250 knots; steaming radius at full speed, about 1,875 knots; maximum brake horse power, main turbine engines est., 16.000; indicated horsepower, auxiliaries, 400; time allowed for completion, 34 mos.

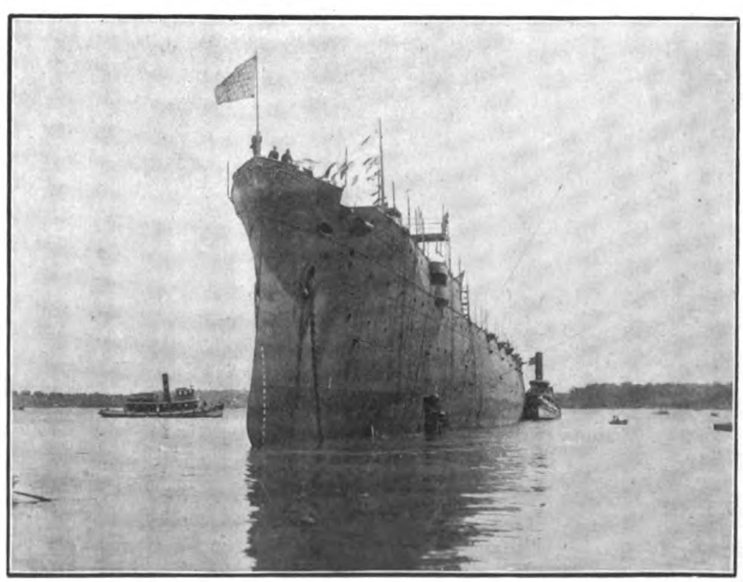
The freeboard of the vessel is greater than that of any other vessel in the navy, being at the normal, 19-ft. 8½-in. amidships, 34-ft. 0-in. at the stem, and 21-ft. 6-in. at the stern. The high freeboard insures good sea-going qualities, gives great range of stability and provides a safe and dry vessel under all conditions of weather. On account of the high freeboard it has been possible to provide commodious quarters for the officers and crew, well above the waterline. A forecastle has been provided above the main deck, for about one quarter of the length, and deck houses have been arranged abaft the forecastle.

Ample subdivision has been made to insure the vessel keeping afloat with no resulting serious change of trim or loss of stability if several of the compartments are pierced.

In planning the structural details the greatest care has been exercised to provide a hull which shall combine with lightness, the strength and stiffness necessary to successfully withstand the severe shocks which the vessel may be called upon to undergo, and particular attention has been paid to the watertight bulkheads, that they may be able to withstand the pressure due to the flooding of any compartment and thus avoid endangering the vessel as a whole.

The hull will be built of steel throughout, two longitudinal bulkheads will be worked continuous throughout the engine and boiler spaces, one on each side, extending from the bottom of the vessel to the main deck, and inclined slightly inboard at the top. In order to avoid any break in the continuity of the strength of the vessel the upper and lower strakes of these bulkheads will extend well beyond the limits of the machinery spaces, forming large brackets gradually tapered off. Between these longitudinal bulkheads, and extending throughout the boiler and engine room, an inner bottom will be worked, so that the vessel will be well protected from injury in case of grounding.

Five decks, designated as forecastle, main, berth, orlop and platform, respectively, will be worked, the main and berth decks being continuous from stem to stern. Nickel steel protection of 80 lbs. per square foot will be worked on the shell plating for the length of the machinery space including the dynamo room, extending from about 3-ft. 4-in. below the waterline to about 9-ft. 6-in. above, abreast the engine and dynamo rooms and 6-ft. 6-in. above, abreast the boiler room. At the forward end of the machinery space and the after end of the dynamo room, partial athwartship bulkheads of 40 lbs. nickel steel will be fitted, of the same depth as the adjoining side protection. Nickel steel protection will also be fitted in wake of the steering engine.



SCOUT CRUISER SALEM IMMEDIATELY AFTER LAUNCHING.

The battery consists of two 5-in. and 6 3-in. rapid fire guns and two 21-in. submerged torpedo tubes.

Two submerged torpedo tubes of the side-loading type with all necessary accessories including air compressors and accumulators, will be installed in the torpedo room forward, one on each side. Four torpedoes for each tube will be carried.

The magazines have been so arranged that about half the total supply of ammunition will be carried at each end of the vessel, and four ammunition hoists driven by constant speed electric motors will deliver ammunition to the guns. Battle order and range indicators will be fitted in accordance with the usual naval practice.

The engines will be Curtis marine turbines, 120-in. diameter 7 stage reversible, located in separate compartments, of a combined brake horse power of 16,000, arranged for outboard turning propellers when going ahead. The steam pressure at throttle valve will be 250 lbs. Maximum revolutions at full power will be about 350 per minute. The necessary auxiliaries and accessories will be provided in accordance with the practice of the bureau of steam engineering.

There will be twelve watertube boilers of the Fore River Express type, placed in three watertight compartments, with a total grate surface of 693 square feet, and a total heating surface of 37,080 square feet. The working pressure will be 275 lbs. per square in. The steaming capacity will be such that all the steam machinery can be run at full power with an average air pressure in the firerooms of five inches of water. Four smoke pipes, each 75 ft. high above the base, will be fitted. An evaporating and distilling plant capable of evaporating and condensing 16,000 gallons of water per day will be installed, and a refrigerating plant of 2 tons capacity will also be fitted. The vessel will be steam heated throughout.

The vessel will be lighted throughout by electricity, about 600 incandescent lamps, 22 arc lamps and two 60-in. searchlights being contemplated. To supply the current for these lights and the various electric driven auxiliaries about the ship, deck winches, ammunition hoists, ventilation sets, air compressors, etc., three 32 kilowatt steam-driven generating sets, of 125 volts pressure at the terminals will be installed in the dynamo room on the platform deck aft.

Two stockless anchors arranged to stow in the hawse pipes, and one navy type anchor stowed on a billboard will be fitted, with complete arrangements for handling and stowing the same. The windlass will be of the vertical spindle type, with two wildcats and gypsy heads, and will be installed on the main deck forward.

The steam steering gear will be of the usual navy type, with the steering engine located in a separate watertight compartment aft, and with the usual steering stations in the chart house and on the bridge.

Two masts will be provided, the foremast being fitted for the installation of wireless telegraph. A room for the wireless telegraph instruments will be located on the main deck amidships.

The chart house and emergency cabin in the after end of the forecastle deck will be of bronze. The chart house and the bridge above will be supplied with the usual steering stands, engine telegraphs and indicators.

The arrangement of the quarters provides accommodations for a commanding officer, 12 wardroom officers, five warrant officers, and 340 men. The quarters for the officers are located in the after portion of the vessel with the usual staterooms, messrooms, etc., as customary in the naval service. The amidship and forward portions of the vessel are given up to the crew, with the usual lavatories, dispensary, sick bay, etc. Quarters for the chief petty officers are provided on the orlop deck forward.

The houses on the main deck contain the galleys, bakery, breadroom, blacksmith shop and wireless telegraph room. A large workshop is provided on the berth deck between the engine hatches, and the firemen's washrooms are also located on the berth deck, between the uptake enclosures.

The following boats will be carried on the vessel and will be handled by davits: One 28-ft. steam cutter, one 33-ft. launch, two 30-ft. cutters, three 28-ft. cutters, one 30-ft. whale boat, one 30-ft. gig, and one 14-ft. dinghy.

John Lindstrom, the Pacific coast ship builder, has two steam schooners under construction in his yards at Aberdeen, Wash., and three at his yards at Eureka, Cal. Mr. Lindstrom has no further contracts in sight and believes that his present ones will carry him well over into the new year. Mr. Lindstrom believes that on account of the unusual conditions in the way of prosperity in the lumber trade there have been more steam schooners built in the last two or three years than are called for by the amount of business and he consequently expects a let up in building for some time.

COLLIER MALDEN LAUNCHED.

The steamship Malden, which was launched at Quincy on Tuesday, is the second of three similar vessels designed and being constructed by the Fore River Ship Building Co. for the New England Coal & Coke Co., of Boston, The collier was christened by Miss Katherine McCook, of Riverside, Mass. The vessel is intended for the coal trade between this port and the south, and is of the following dimensions: Length over all, 400 ft.; breadth, extreme, 53 ft.; depth, 32 ft. 6 in.; gross tonnage, about, 5,340 tons.

The Malden is a single screw steamship of the single deck type with long poop, bridge, and forecastle, and constructed on what is known as the self-trimming system. This consists in sloping the hatchways from their side coamings to the side of the ship having an angle of about 45 deg., the triangular prism formed by this line with the topsides on the spar deck being cut off and utilized as topside ballast tanks to be filled with water when the vessel is running light. In addition to these ballast tanks a deep inner bottom will be provided right fore and aft for the carriage of water ballast in addition to the usual fore and aft peak tanks. The great capacity for water ballast thus provided will insure a good immersion of the vessel when in the light condition, thereby providing greater stability and guarding against emmersion of the propeller in this condition. This system of construction is a special feature of these vessels, and the structural arrangements incorporated are novel in ship construction.

The vessel will be rigged with three pole masts, and the machinery will be located right aft.

The vessel's hull is built right up to a long poop deck aft, which will enclose the engine and boiler casings, reserve coal bunker, and accommodations for firemen, seamen, oilers, and their wash places. On top of this deck there has been constructed a steel Liverpool house, in which have been arranged commodious staterooms for the berthing of chief engineer and his assistants, together with mess rooms, bath rooms, and toilet arrangements.

The bridge deck with sides of ship built up supporting same has been constructed well forward of the half length. In this enclosure there has been provided the officers' accommodations, dining room, bath rooms, spare stateroom, ice room, pantry, store room, etc. On top of this

deck a steel chart house has been arranged with access stairway from spar deck to this house. In addition to the chart house, at the forward end commodious quarters have been provided for the captain with bathroom, etc., adjoining.

The pilot house, which is a specially handsome structure, strongly built of teak and finished bright, is arranged overhead with navigating bridge in front of same, and above this with access therefrom a flying bridge with electric projector, standard compass and steering station has been provided.

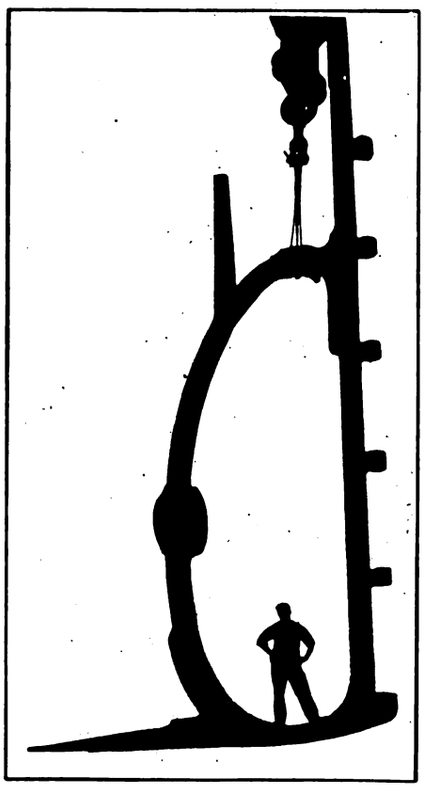
The forward part of vessel has been carried up, forming a top gallant forecastle about 36 ft. long, on which has been installed a powerful steam windlass of the latest type, operating stockless anchors.

The Malden is sub-divided by transverse watertight bulkheads into five large cargo holds, each about 48 ft. in length, specially constructed for the stowage of coal or mineral cargoes, each hold being operated through two cargo hatches 28 ft. in breadth by 14 ft. in length. The hatch covers are of steel and of special construction to insure absolute watertightness and quick handling of the covers in opening and closing. These cargo holds provide for the stowage of 7,200 tons of coal in addition to the bunker coal carried for steaming purposes. Arrangements have been made at the loading terminal for filling the vessel in about five hours and discharging in Boston by means of grabs in little over double this time.

The Malden has a machinery installation consisting of a set of triple-expansion surface condensing engines having cylinders 28, 44 and 73-in. in diameter, with a common stroke of 48 in., all of which are fitted with piston valves. Steam is provided by four single ended Scotch boilers 14 ft. 2½ in. mean diameter and 8 ft. 10 in. in length, each boiler being provided with corrugated furnaces of the latest pattern Morison suspension type, constructed for a working pressure of 180 lbs. per square inch. In addition to these boilers, a donkey boiler is carried for auxiliary purposes. It is anticipated that this machinery installation will insure a continuous sea speed of 11 knots when fully loaded, making this class of vessel the swiftest, as they are probably the largest, of their class afloat. It may be said that these vessels have been specially strongly constructed to withstand the hard trade in which they will be engaged. The scantlings are in excess of the United States Standard Register requirements, to whose survey they have been specially constructed with a view to obtaining the highest class which this society awards. It need hardly be said that in first-class vessels of this description special attention has been given to the berthing and messing of officers and crew, these being specially commodious, well lit, furnished and ventilated so that, although engaged in the coal trade, the complement will be berthed in as comfortable a manner as that obtaining in ordinary passenger vessels.

FORE RIVER FORGINGS.

The stern frames for the three steam colliers built by the Fore River Shipbuilding Co., of Quincy, Mass.,



STERN FRAME OF COLLIER MALDEN.

are examples of complicated steel forging which, it is asserted confidently, would hardly be attempted by any other forge in this country.

The accompanying illustration shows the stern frame of the Collier Malden, the second of the three vessels constructed for the New England Coal & Coke Co., of Boston, for the transportation of coal between Boston and southern ports, which vessel will be launched by the middle of September.

The dimensions of this massive forging are:

Weight	13½ tons
Sectional width	11 ins.
Sectional thickness	7 ins.
Length of rudder post	36 ft. 8 ins.
Length of heel	17 ft.
Length of spur	6 ft. 6 ins.
Length of propeller aperture	21 ft. 6 ins.
Width of propeller aperture	7 ft. 5 ins.
Diameter of boss (inside measure	2 ft. 1½ ins.

This stern frame was forged from 80,000-lb. ingots of a special grade of low phosphorus and sulphur steel, showing the following physical characteristics from a test specimen cut from a full size prolongation of the forging:—

Tensile Strength	Elastic Limit	Elongation.	Contraction of area
51,350 lbs.	31,200 lbs.	38%	65.63%

It is obvious that metal exhibiting such an amount of elasticity and ductility has many advantages over the usual wrought iron product, particularly when viewed from a mechanical standpoint. As the practical man is aware, heavy wrought iron forgings are more or less spongy, requiring subsequent doctoring to patch up bad welding which often but veneers a bad interior.

Properly melted and discarded steel ingots on the other hand produce homogeneous forgings free from these weld troubles and aside from a tendency to somewhat more rapid corrosion, insure a more reliable forging.

The method of scarfing the two sections facilitates repairs to the portion most liable to accident.

STEAM LIGHTER NEW ENGLAND.

The steel steam lighter New England was constructed by the Fore River Ship Building Co. for the New England Steamship Co. The vessel is intended for service in Boston harbor and is of the following dimensions: Length over all, 130 ft.; extreme beam, 31 ft. 6 in.; depth molded at center, 13 ft. 6 in.; gross tonnage, 450 tons.

The New England is a first-class lighter of modern type. She will have one mast and a boom about 55 ft. long and one 7 in. x 10 in. twin drum hoisting engine. All gear is designed for seven tons.

The propelling engine is direct acting, with cylinder 26 in. in diameter and 26 in. stroke of piston, making 100 revolutions per minute. Steam is provided by two horizontal return

tubular boilers, each 66 in. in diameter by 14 ft. long, with a grate area of 70 sq. ft.

The propeller is four bladed, cast solid, with a diameter of 7 ft. 6 in. and a pitch of 10 ft. 6 in.

The smokestack will be about 40 in. inside diameter, and the outside stack about 50 in. in diameter.

The deck house contains the pilot house, berthing for captain and mates, and galley at the extreme after end.

She will have three watertight bulkheads. In the main deck forward there will be a hatch 8 ft. 6 in. square. She will be equipped with a Blake duplex donkey pump, a Williamson steering engine, also metallic life boat, as well as axes, fire extinguishers and all other equipment required by law.

BIDS FOR TORPEDO BOATS.

Bids were opened at the navy department last week for the construction of four torpedo boats. The new boats do not embody in their designs any startling departures in naval construction. In one sense the designs appear to be reactionary, for the maximum speed required is placed at 28 knots per hour, whereas some of the boats constructed several years ago were obliged to show a trial speed of over 30 knots. But these 28 knot boats are expected to be much more serviceable craft than the early types. They represent several years' experience in the hardest kind of torpedo-boat drills and cruisers for our little flotillas have made world's records in long-distance voyages, and their commanders invariably reported in favor of structural strength, stability and coal endurance, as against high speed. So the effort of the naval designers in this case has been to plan a type of boat that will have great seagoing power on a limited displacement of 700 tons, and to that end they were willing to sacrifice the extra two knots which experience has shown could rarely be realized in service conditions or anywhere else than on a trial course.

On the face of the bids received it appears that if the navy department intended to adhere strictly to the terms of the advertisement and require the contractors who wished to provide their own designs of machinery to use the department's hull plans the lowest bids were those of William Cramp & Sons Ship Building Co. of Philadelphia, for two boats at $575,000 each; the Bath Iron Works of Maine, two boats, bid at $584,300 each, and the Fore River Ship Building Co., Quincy, Mass., one boat at $648,000.

COMMERCE OF LAKE SUPERIOR.

Notwithstanding the handicap of the ore handlers' strike the general commerce of Lake Superior to Sept. 1 of the present year shows a considerable increase over the corresponding period last year. To Sept. 1, 1907, 33,526,388 tons were moved, against 29,954,278 tons for the equivalent period of 1906, a gain of 3,572,110 tons. The commerce of August amounted to 8,544,833 tons which is only 320,609 tons less than the record movement of the present year, made in June. Following is the summary:

MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

Items	To Sept. 1, 1907.	To Sept. 1, 1906.	To Sep 1, 1905.
Coal, anthracite, net tons	833,924	513,783	550,786
Coal, bituminous, net tons	6,328,553	4,412,419	3,427,034
Iron ore, net tons	22,485,323	21,247,365	19,596,553
Wheat, bushels	48,430,731	30,690,574	16,086,194
Flour, barrels	3,165,345	3,116,994	2,126,094

REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO SEPT. 1 OF EACH YEAR FOR THREE YEARS PAST.

EAST BOUND.

Items	To Sept. 1, 1907.	To Sept. 1, 1906.	To Sept. 1, 1905.
Copper, net tons	42,497	62,033	54,580
Grain, other than wheat, bushels	23,433,385	28,262,403	12,705,843
Building stone, net tons	320	1,472	7,463
Flour, barrels	3,165,354	3,107,910	2,118,917
Iron ore, net tons	22,485,323	21,247,365	19,596,553
Iron, pig, net tons	9,271	17,463	39,724
Lumber, M. ft. B. M.	417,715	552,891	570,119
Silver ore, net tons			
Wheat, bushels	48,430,731	30,690,574	16,086,194
Unclassified freight, net tons	66,852	103,074	55,937
Passengers, number	25,043	25,068	20,384

WEST BOUND.

Items	To Sept. 1, 1907.	To Sept. 1, 1906.	To Sept. 1, 1905.
Coal, anthracite, net tons	836,924	513,783	550,786
Coal, bituminous, net tons	6,328,953	4,412,419	3,427,034
Flour, barrels		9,084	7,175
Grain, bushels		6,749	1,533
Manufactured iron, net tons	178,037	204,116	65,829
Salt, barrels	276,267	276,551	257,206
Unclassified freight, net tons	537,055	575,972	403,655
Passengers, number	25,612	25,666	23,164

SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To Sept. 1, 1907.	To Sept. 1, 1906.	To Sept. 1, 1905.
East bound freight of all kinds, net tons	25,603,655	24,504,547	21,673,180
West bound freight of all kinds, net tons	7,922,733	5,749,731	4,491,619
Total freight, net tons	33,526,388	29,954,278	26,164,799

Total number of vessel passages to Sept. 1, 1907, was 12,178, and the registered tonnage, 25,155,715.

SHIP BUILDING DURING AUGUST.

The bureau of navigation reports 124 vessels of 57,205 gross tons were built in the United States and officially numbered during August as follows:

	WOOD				STEEL				TOTAL	
	Sail		Steam		Sail		Steam			
	No.	Gross	No.	Gross	No.	Gross	No.	Gross	No.	Gross
Atlantic and Gulf	12	5,390	81	1,115	....	.....	5	9,255	48	15,746
Porto Rico	...	.....	...	.....	....	.....	....	.....	...	.....
Pacific	2	55	23	2,810	....	.....	2	2,622	27	5,488
Hawaii	...	.....	...	.....	....	.....	....	.....	...	.....
Great Lakes	...	.....	22	783	....	.....	7	31,756	29	25,539
Western Rivers	...	.....	20	432	...	.....	...	.....	20	432
Total	14	5,452	96	5,140	....	.....	14	48,613	124	57,205

The largest steel steam vessels included in these figures are the William M. Mills, Jay C. Morse, Milinokett, City of Savannah, Calumet, Odanah, Wissahickon and Seward. With the exception of the City of Savannah and Seward all these vessels are lake-built.

The steam schooner San Pedro, owned by the Metropolitan Redwood Lumber Co., Metropolitan, Cal., and which sent the passenger steamer Columbia to the bottom recently has been released on a $17,500 bond and taken under her own steam to Bendixsen's yard, Eureka, Cal., to be temporarily patched up. She will go to San Francisco for permanent repairs.

THE MARINE REVIEW

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EVOLUTION IN COAL CARRIAGE.

The Fore River Ship Building Co., Quincy, Mass., is constructing three steam colliers for the New England Coal & Coke Co., the Everett, Malden and Melrose, of which the two former have been launched. It is predicted that these three colliers will work a revolution in the coal-carrying trade between Boston and New England. There is, in fact, great room for improvement in the methods of handling bulk freight on the coast. The coast could well afford to take a lesson from lake practice in this particular. In fact, the old methods of transporting coal by water on the coast have been in sailing vessels. Obviously such a method is subject to great delay in bad weather. Thus it has happened time and again that sailing vessels and barges in tow have been prevented by stress of weather from rounding Cape Cod for two or three weeks. Then when it cleared up they all started for Boston together and got to port the same day with the result that only a few of them could get to the docks to discharge cargo. The others had to lie out in the harbor with demurrage and other expenses running up day after day awaiting their turn to be docked. The same conditions and delays are met at the loading ports, bad weather invariably causing confusion and consequent expense.

In an endeavor to obviate as much as possible these unnecessary delays, the New England Coal & Coke Co. gave an order for three steam colliers to the Fore River Ship Building Co. The three colliers when in service will bring into Boston 1,500,000 tons of coal per year, of which 600,000 tons will be consumed by the company itself at its plant at Everett, the balance being for sale. The colliers are designed to carry 7,200 tons of coal at a sea speed of 11 knots per hour. They are the largest and speediest American vessels of their class in coastwise trade. It is expected that these ships will load in five or six hours ultimately at a modern terminal at Hampton Roads and unload in ten hours at a modern terminal at Everett, running as regularly as ferry boats, no ship being in port over one day.

It is an ordinary day's work on the lakes to discharge a 10,000 ton ore carrier in a day of ten hours' working time. It is common to put such a cargo aboard in three or four hours; but coal has not yet been either loaded or unloaded with the dispatch that it is expected these three colliers will make. It will be interesting, therefore, to inquire into the equipment at the terminals at which these colliers will load and discharge. The significant point, however, in the building of these colliers is the fact that the coast is beginning to awaken to its delinquencies in the matter of handling bulk freight. It has always been a matter of astonishment to lake men to observe the dawdling methods of handling freight at coast ports.

OUR WATERWAYS.

The Inland Waterways Commission will meet in Cleveland on Sept. 21 and will make a tour of the great lakes and Mississippi valley. In this connection it is interesting to note that Mr. Lyman E. Cooley, of Chicago, points out in an article in a recent issue of *System* that there is practically no limit to the waterway extension in the Mississippi valley. In this valley on the draught of 3 ft. there are 15,000 miles of navigable rivers. He believes that a trunk waterway should be created so that ocean freighters could pass from the Gulf of St. Lawrence to the Gulf of Mexico. The Chicago drainage canal with 24 ft. draught has set the pattern for final development to this trunk. At St. Louis the main trunk would be joined by the upper Mississippi branch with a Lake Superior connection through the proposed St. Croix channel, while at Cairo would enter the Ohio trunk with its current of trade augmented by a ship canal from Lake Erie. To quote his own words:

"In the Mississippi valley it is safe to assume that an ultimate development of 80,000 miles of waterways and 220,000 miles of railways will no more than meet the final demands of commerce. In providing for such waterways we will be aiding rail lines, not robbing them. They will always transport the high class freights, perishable goods and products demanding immediate delivery at advanced rates, while the canals will carry the coal, grain, stone, building materials and heavy machinery which the railroads now handle with difficulty and which block traffic in the whole country."

There is imagination, prophetic vision and practical reasoning in the statement just quoted. The commerce of this country is expanding so rapidly, is growing in such multitudinous ways that it will probably require 80,000 miles of waterways and 220,000 miles of railways to adequately handle it. Moreover, instead of the canal or

the canalized river being the enemy of the railroad, it is the railroad's greatest feeder and natural ally.

IN LAKE SHIP YARDS.

The Frontier Steamship Co., organized by leading interests in North Tonawanda, will have three new steamers on the lakes next year. They will be 550 ft. over all, 530 ft. keel, 56 ft. beam and 31 ft. deep, and will have triple-expansion engines, 23, 37 and 63 in. cylinder diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 15 ft. in diameter and 12 ft. long, each fitted with three 44-in. Morrison furnaces. W. M. Mills, who will be manager of the Frontier Steamship Co., has already decided to name the boats Josiah G. Munro, James Corrigan and Daniel B. Meacham. Nacey & Hynd, naval architects of Cleveland, will superintend the construction of the vessels, and they will be classed to the highest register of the American Bureau of Shipping.

The steamer John J. Boland was launched a week ago Saturday from the Ecorse yard of the Great Lakes Engineering Works. The Boland, which is named after the well-known Buffalo vessel agent, is 500 ft. over all, 480 ft. keel, 54 ft. beam and 30 ft. deep. She has fourteen hatches spaced 24 ft. centers and is equipped with triple-expansion engines, 22½, 36 and 60 in. cylinder diameters by 42-in. stroke, supplied with steam from two Scotch boilers, 13 ft. 9 in. by 11 ft. 6 in. The freighter was christened by Mrs. Boland.

The steamer Crete, the third of the eight boats building for the Lackawanna Steamship Co., was successfully launched at the Lorain yard of the American Ship Building Co. on Saturday last, and was christened by Miss Bessie Whitmore, of Lorain. The Crete is 500 ft. long, 480 ft. keel, 52 ft. beam and 31 ft. deep. She will go into commission in about a month. Capt. F. B. Huyck will sail the new boat.

The steamer Osler, building for the St. Lawrence & Chicago Steam Navigation Co. was launched at the Bridgeburg yard of the Canadian Ship Building Co. on Tuesday and was christened by Mrs. Wilmot Matthews. The Osler is 510 ft. long, 491 ft. keel, 56 ft. beam and 31 ft. deep. She has the distinction of being the largest vessel ever constructed in Canada.

The steamer J. J. Sullivan, building for the Superior Steamship Co., will be launched at the Cleveland yard of the American Ship Building Co. on Saturday, Sept. 14.

The steamer Edwin F. Ohl, building for W. H. Becker, of Cleveland, will be launched at the Wyandotte ship yard on Saturday, Sept. 21.

The first section of the 600-ft. floating dock, building for the Empire Ship Building Co., of Buffalo, will be launched early in October.

ORE SHIPMENTS.

The August movement of ore was certainly surprising and can simply be regarded as additional evidence of what lake equipment is really capable of. It was not expected that by any month during the year would the June record of 6,433,469 tons be broken. The delay in the early part of the month owing to labor troubles was supposed to have put an insuperable handicap upon it, but nevertheless August shipments are the heaviest of the year, showing a gain of 1,140,996 tons over shipment for August, 1906, and 373,411 tons over the record movement of June of the present year. The August movement is easily at the rate of 50,000,000 tons per annum and proves conclusively that it will not be a great strain upon the equipment to move the expected 40,000,000 tons this year. The movement to Sept. 1, is 24,341,552 tons, an increase of 1,620,457 tons over the corresponding period for last year. Following are the shipments by ports:

Port and dock.	August, 1906.	August, 1907.	To Sept. 1, 1906.	To Sept. 1, 1907.
Escanaba	871,106	918,286	3,436,611	3,731,165
Marquette	403,331	574,659	1,708,937	1,924,464
Ashland	571,698	607,653	2,251,057	2,314,760
Superior	906,960	1,334,790	3,578,496	4,416,454
Duluth	1,601,941	2,051,280	6,584,272	7,202,645
Two Harbors	1,310,779	1,320,143	5,161,722	4,752,064
Total	5,665,815	6,806,811	22,721,095	24,341,552
1907 Increase		1,140,996		1,620,457

FREIGHT SITUATION.

The general freight situation on the lakes has presented no especial phase of difference during the past week. Ore has been moving with reasonable dispatch though heavy rains in the mining country have interfered with its delivery at upper lake ports. Vessel owners are kept reasonably busy by contract tonnage and few boats are in the market for wild tonnage. The grain trade has proved a disappointment and only small carriers are being placed, as line boats are monopolizing the small quantity in stock. Coal is also slow.

IRON AND STEEL.

Some improvement in sentiment in pig iron is noted, but sales have not been of large proportions. Indications are present that an understanding has been reached by southern producers to maintain a price of $18.50, Birmingham. Some definite outcome is expected shortly to the deliberations of manufacturers and railroad interests over rail specifications but at present little new business is reported. Deliveries generally are showing improvement as new business for finished lines is not in as large volume as has been. The monthly compilation of *The Iron Trade Review* shows the pig iron production of the United States for August to have been 2,216,470 tons, against 2,253,243 tons in July.

AROUND THE GREAT LAKES.

The schooner Santiago, which sank at the dock at Escanaba while partially loaded with ore, has been floated.

It is announced that the freighter Ward Ames, launched about 10 days ago at Superior, will make her maiden trip on Sept. 10.

The wrecker Favorite, of the Great Lakes Towing Co.'s fleet, has succeeded in releasing the steamer Nyanza, ashore near Marquette.

The steamer Mary, which is used as a ferry between resorts at Holland, Mich., burned to the water's edge last week. The Mary was owned by J. C. Everett of Chicago.

The new Anchor Line package freighter Wissahickon was given a trial trip at Buffalo last week and proved satisfactory in every way. The freighter was built at the yard of the Buffalo Dry Dock Co. under the supervision of Edward N. Smith, Jr.

The steamer Leland S. DeGraef delivered a cargo of 12,177 gross tons of ore at the Toledo Furnace Co.'s plant at Toledo last week. This is the largest cargo ever delivered at Toledo.

While repairs were being made on the car ferry Huron at the Grand Trunk slip at Windsor she sank at her dock. The Huron's stern was raised by flooding the forward compartments and she was also listed considerably by running several cars of coal aboard. In this position she was not able to stand up under the waves thrown by passing excursion steamers and she went down in 25 ft. of water. Mr. Harris W. Baker, the wrecker, will raise her.

CANADIAN TRADE.

Editor MARINE REVIEW:—The total shipments of the crop of 1906, through Port Arthur and Fort William, to Sept. 1, amounted to 51,500,000 bu.

The elevators at both these ports are practically full today, with a large amount of this year's crop still in interior elevators, and unmarketed, so that while the present prospects for the crop of 1907 are that it will be a light one, possibly in the neighborhood of 65,000,000 to 75,000,000 bu. the outlook for the lake carrying trade is good, owing to the large amount of the old crop still on hand to be moved.

Coal receipts at the head of the lakes exceed anything in the history of these two ports, and it is quite evident from the quantity still to be received, that all four docks will be worked to their fullest capacity to the close of the season, to take in the quantity already under contract.

It is almost impossible to pick up vessels for any kind of wild trade out of here, such as timber, wild coal cargoes, or pig iron.

The Atikokan Iron Co. are now offering their first shipments of pig iron, for Lake delivery at eastern points. This is a trade that from now on will grow very materially, as the blast furnaces are about to quadruple their plant.

This is the off season for the package freight business, and it has consequently slackened down rather below the normal, but will soon pick up now that the fall trade is commencing.

The Canadian Lake line are adding two magnificent steamers to their line, the first of which will be in commission on the lakes about Sept. 15, and the other about Oct. 15. They are both on their way across the Atlantic at present.

Upper lake passenger travel has exceeded anything in the history of Lake Superior. The steamer Huronic of the Northern Navigation Co., has been filled to her capacity for the past three months. The Canadian Pacific railway steamers, and the Booth line steamers have had more passengers than they could well take care of. More and more tourists are coming this way each year.

Large quantities of material, and the entire plant of the contractors, have arrived, for the construction of the new government breakwater, which is being extended from a point on the old breakwater in a general southerly direction, and will be continued to the mouth of the Kaministquia river at Fort William. When this breakwater is completed Port Arthur will have a harbor with a capacity for handling more tonnage than any port on either side of the chain of lakes.

The government is placing a gas buoy at Jackfish. It has installed a new fog horn on Thunder Cape, and is about to do the same at Victoria Island and Welcome Island.

These very necessary coast aids will do much to facilitate the navigation of these waters in thick and heavy weather.

The Ottawa government has done very wisely by keeping the Welland and St. Lawrence canals open on Sundays, beginning Sept. 1, for the balance of the season. This will materially aid vessels in the Kingston and Montreal trade, and add very largely to the tonnage passing down the St. Lawrence river.

J. J. O'CONNOR.

QUESTIONS FOR MASTERS AND MATES.—NO. 41.

571. If the deviation on N x E correct magnetic is 8 degrees Ely. and 14 degrees Ely. on NE½N correct magnetic, how much will it be on correct magnetic NNE¼E?

572. You are out of sight of land and are steering, say ENE by steering compass, which has a deviation of ¾ pt. on this course; by standard compass the ship is heading NE x E¼E, there being no deviation on this course for the standard compass. After you have been out for some time you find that when the steering compass says ENE the standard compass says NE x E⅝E. What would you do and which compass would you depend on?

573. You are steering SE by pilot house compass, which has a deviation of 8 degrees Wly. How is your boat heading correct magnetic?

574. What is the difference between a ship's head by compass and ship's head correct magnetic?

575. Is the deviation the same for a ship's head by compass as for ship's head correct magnetic?

576. When is the most favorable time to take azimuths of the sun?

577. You are heading NNE by compass and by the same compass Pilot Island bears NW x N when Cana Island bears by the same compass SW½W; the deviation for ship's head ⅝ pt. Wly and the variation is ⅛ pt. Ely.; what is the true bearing of Pilot Island and also what is the true bearing of Cana Island?

578. If you have to steer WSW by compass from Buffalo to Long Pt, what course would you steer by this same compass from Eagle Harbor to Devil's Island? What is the mean correct magnetic course in each case and also what is the true course?

579. What correct magnetic course will correspond to a mean correct magnetic course of NE?

580. What is the difference between a correct magnetic course and a mean correct magnetic course? Does the ship's head correct magnetic correspond to ship's head mean correct magnetic; in other words, if the mean correct magnetic course is E x S what correct magnetic course must the ship steer in order to make this good?

QUESTIONS FOR WHEELSMEN AND WATCHMEN.

FIFTEENTH INSTALMENT.

167. Draw a diagram illustrating Rule II of Pilot Rules.

168. What would you do if you saw a red light on your port bow?

169. If sailing closehauled on the port tack you met another sailing vessel going free with her boom to port, what would you do?

170. Why?

171. If you were sailing east with a beam wind and met a sailing vessel going west with the same wind, head on, what would you do?

172. If a steamer heading north met a steamer heading NW which must go astern of the other?

173. Why?

174. How would you direct your course to starboard in a steam vessel?

175. What signals are not permitted to be used by the law governing the management of vessels when underway?

176. How could you tell in thick weather when a steamer had another vessel in tow?

177. How could you tell in the night time?

178. Supposing you were coming up on her from a point more than two points abaft her beam?

ANSWERS TO QUESTIONS FOR WHEELSMEN AND WATCHMEN.

TWELFTH INSTALMENT. PUBLISHED AUG. 15.

131. The one coming down with the current.

132. Usually pass to starboard; 1 blast and port helm. This of course would depend altogether upon circumstances, but ordinarily they pass each other to starboard.

133. The entire cubical contents below decks, the entire hold. It is measured in spaces of 100 cubic feet

to the ton. It is the full size of the ship.

134. Net tonnage is the gross tonnage minus the space occupied by the boilers, engines, chain lockers, etc. Whatever these occupy in spaces of 100 cubic feet deducted from the entire cubical contents (in spaces of 100 cubic ft.), between decks is called the net tonnage of the ship.

135. Gross tonnage. Gross tonnage represents the size of the ship. Two ships may have the same gross tonnage, but not the same net tonnage, the boilers and engines occupying more or less space.

136. The register length of a boat is her tonnage length, that is, it is between her overall length and her keel length.

137. A ship's greatest length.

138. Four of them.

139. A 3-point course.

140. Six-points.

141. Two blasts.

142. At sunset.

STAGES OF WATER.

The United States lake survey reports the stages of the great lakes for August as follows:

Lakes.	Feet above tide water New York.
Superior	602.93
Michigan and Huron	581.45
Erie	573.03
Ontario	246.85

During August all of the lakes have lowered, except Lake Superior, which rose over 2 in.

During September Lake Superior should hold its present level, or rise a little. Lakes Michigan-Huron are likely to fall 2 in., Lake Erie 3 in., and Lake Ontario 4 to 5 in. These are averages, and an exceptionally wet September may check this lowering, or an unsually dry September may accent it.

During August Lake Superior rose 2¼ in. and has practically the same height now as a year ago and in 1895 and 1904. It is 1½ in. lower than the average August stage for the past 10 years, 2 in. lower than in 1905, and a foot lower than in 1876.

Lakes Michigan and Huron fell 1¼ in., but are still an inch higher than August last year, and 5 in. higher than in 1895, and 5 in. higher than the average August stage for the past 10 years. They are, however, lower by an inch than in 1905, and 24¾ in. lower than in 1876.

Lake Erie fell 3½ in., but is still nearly 5 in. higher than last year, 20 in. higher than in 1895, 2 in. higher than in 1905, and 6 in, higher than the average August stage during the past 10 years; but lower by an inch than in 1904 and 13 in. lower than in 1876.

Lake Ontario fell 3½ in. between July and August, but is still 6 in. higher than last year, 30 in. higher than in 1895, and 7½ in. higher than the average August stage during the last ten years; but it is lower by 11 in. than in 1904, and 14 in. lower than in 1876.

POSITION FINDING.

(Continued from Aug. 29.)

SOMETHING ABOUT SQUARE ROOT.

Supposing that it was desired to know the distance the ship was from the object at first bearing, without laying it off on the chart and measuring the distance. Square root tells us that in any right-angle triangle, (the 4-point bearing), the square described on the hypotenuse is equal to the sum of the squares described on the other two sides. Take the example in Fig. 1, for instance, ship to lighthouse (the first bearing SW) represents the hypotenuse (the side opposite the greatest angle is always the longest side and in right-angle triangles is called the hypotenuse) and the course south (ship to A) and the bearing west (A to lighthouse) represents the two equal sides, because the angles opposite them are equal (each 45°). Hence the sum of the squares of these two equal sides equals the square on the hypotenuse, or in other words square each of the equal sides (by multiplying it by itself) of five miles and add their squares together, which equals 50 square miles, and extract its square root, that is, find the greatest whole number and fraction thereof that is contained in the figures representing the squares. The root found for the foregoing example will be practically seven miles, the distance the vessel was from the lighthouse at first bearing, which was SW, or the ship was seven miles NE of the lighthouse.

THE FOUR-POINT BEARING, OR RIGHT-ANGLED ISOSCELES TRIANGLE.

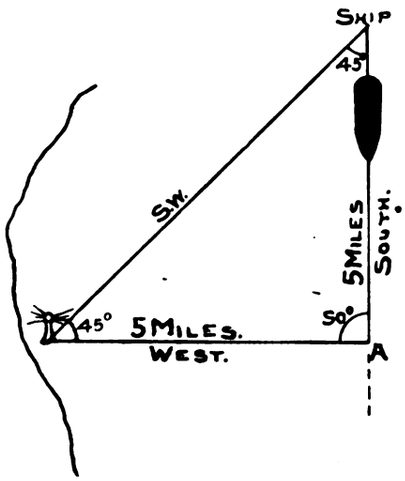


FIG. 1.

The sides marked South and West are equal, each 5 miles. The angles opposite these equal sides are also equal, each 45 degrees. The angle at A equals 90 degrees, hence 45° + 45° + 90° = 180°, the sum of the angles of any triangle, whether isoceles, equilateral, scalene, etc.

4-POINT BEARING AN ISOSCELES TRIANGLE.

Bear in mind that the figure of a 4-point bearing is called an isosceles triangle. A right-angle triangle is a triangle containing the right angle, but the other two angles are unequal, hence their sides are unequal. Nevertheless, the two unequal angles together would equal 90°. This being a fact the squares of these two sides must equal the square on the hypotenuse, and so it does. The sides of a right-angle triangle are, the base (usually the smallest side), the perpendicular, which is longer than the base but shorter than the hypotenuse. If a ship steered N 20° E she would be making an angle of 20° with the meridian; hence the meridian represents the perpendicular, and a line drawn at right angles to the meridian and made to meet the line N 20° E, or the hypotenuse, would represent the base. The angle at starting is 20° and this added to the right angle, or 90° = 110°; and 180° — 110° = 70°; hence the angle at the junction between base and hypotenuse is 70°, for the sum of the three angles, 20° + 90° + 70° = 180°. Supposing the ship had run 10 miles on this N 20° E course, the hypotenuse is then 10 miles, and the sum of the length of the perpendicular and base squared will equal the square on the hypotenuse. The sum of squares is 100.

PLOT THE TRIANGLES ON THE CHART.

The best way to get a clear understanding of this subject is to plot each triangle on the chart by means of parallel ruler and compass diagram and then to measure its sides by means of dividers and the mile scale on the chart. Remember that this mile scale can be made to represent feet and yards as well as miles. In plotting it is always an easy matter to know where the right angle is, and you know the angle started with, so all that is necessary is to find the angle opposite the angle started with. This can be done by means of the parallel ruler. Lay the edge of the ruler along the line whose direction is to be found and then transfer it to a compass diagram for reading (the angle). It is well to remember that the perpendicular and base are either north and south or east and west lines. This is not always the

case in bearing methods, but for the beginner these true north and south, east and west lines should be used. For example, the course to be steered is N 30° W, say 20 miles. The first thing to be done is to make a dot on the chart to represent the place of starting. This should be near a compass diagram in order to make the work more convenient. It is less work to mark the starting point on a meridian, for in so doing one side of the triangle is represented, the side formed by the meridian being called the perpendicular of the triangle. Next lay the parallel ruler over the chart compass at N 30° W and S 30° E, and transfer this direction to the starting point and draw a line in the direction of the course. Measure off 20 miles on this line from starting and make another dot. Now draw a true east and west line from the line representing the course and distance of 20 miles, to the meridian, and you have the three sides of your triangle. The right angle is at the juncture of the meridian and the east and west line. To get the angles: You know the angle at start and the right angle; add these together and subtract the sum from 180° gives the third angle. The angle is 60°. Here is another way of getting it: Reverse the direction of the line representing the course, or the hypotenuse. This would be S 30° E. Call the direction of the base line east, or S 90° E. The measure of the angle included between S 30° E and S 90° E will give it; or 30° off 90° will give it. If you did not know the angles lay them

A SERIES OF FOUR-POINT BEARINGS, OR RIGHT-ANGLED ISOSCELES TRIANGLES.

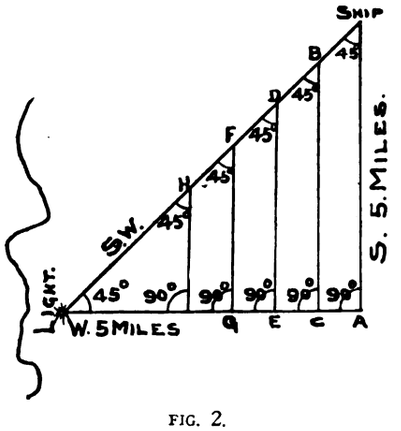


FIG. 2.

BC equals CL, DE equals EL, FG equals GL, HI equals IL. The angle at Ship and H are all equal to 45°. The angle at A, C, E, G and I are all equal, being 90 degrees.

down by means of the parallel ruler as already explained, or by means of a protractor. To get the length of each side of the triangle merely measure with the dividers. To prove your work square the hypotenuse, then square the perpendicular and base and add them, their sum should equal the square on the hypotenuse. In the foregoing example this would 20 × 20 = 400.

THE OTHER HALF OF THE 4-POINT BEARING.

Should it be required to know the ship's distance from the lighthouse at the time of its bearing four points abaft the beam, it would be worked practically the same as in the foregoing examples. Take in the case of the first example illustrated, Fig. 1; thus the ship having sailed for another half hour, equals five miles, at which time (see Fig. 3) lighthouse bore NW, or four points abaft the beam, her

THE FOUR-POINT BEARING INVERTED.

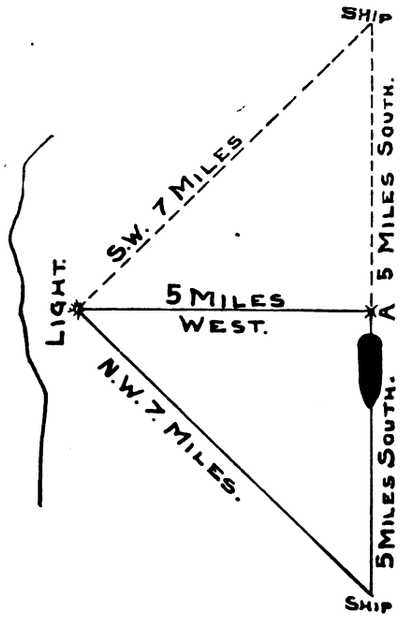


FIG. 3.

The dotted portion shows the first portion of a 4-point bearing, called "bow and beam" bearing, from Ship to A and A to Light in diagram. The plain or lower portion, is the 4-point bearing inverted, called "beam and quarter" bearing. A to Ship equals A to Light. A is the place of ship when abeam, and after running South 5 miles the light bears NW, or directly over the starboard quarter, or the bearing is taken when it is 4 points abaft the beam. By squaring the sides 5 miles and extracting the square root gives the length of the hypotenuse, or the third side. This is 7 miles as will be seen by the above diagram.

distance from it would be seven miles, and would serve as a departure.

THE 4-POINT BEARING INVERTED.

Supposing you were unable to see a lighthouse or other fixed object, by reason of fog, or otherwise, until you were nearly abeam of it, and you were desirous of knowing the distance you were off in passing it when you had it on your beam. The 4-point bearing inverted, as in Fig. 3, would give you the desired information; for the distance from the light (abeam) to change its bearing four points (on the quarter) is the precise distance that you were off the light when you had it abeam. This is called the beam and quarter bearing, so-called from the relative directions as shown from the ship herself.

Ex.—You are steering SW at the rate of 9½ miles per hour. At 3 o'clock Big Pt. Sable bears SE and at 3:24 it bears due east. How far and in which direction are you from the lighthouse?

Ans.—5.37 miles due west of the light. This is a "beam and quarter" bearing, or the 4-point bearing inverted. The ship between bearings has run 3.8 miles, and was, therefore, 3.8 miles from the light when she passed it, or had it on her beam; found thus,

60 : 24 :: 9.5 : x, and x equals 3.8.

Twice the square of 3 8 equals 28.80, the root of which is 5.37.

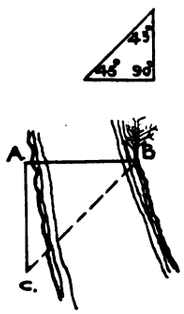


FIG. 4.

Surveyors sometimes make use of the isosceles triangle, or 4-point bearing. From A to B, or from A to tree, in the above diagram, is the distance across the stream to be determined. By walking from A to C, or the distance traversed from A on the line A to C, in order to change the bearing of the tree at B 45 degrees, equals the distance from A to B, or the distance across the stream.

THE STANDARD METHOD.

The 4-point bearing as we have seen is the standard method in coastwise navigation, and when coasting the navigator should rigorously practice the method, for it is handy, quick and reliable. A good navigator would never permit his vessel to pass by a light, a prominent point of land, or other fixed object on shore, without getting the distance at which he is going to pass it or has passed it, as the case may be. If you do not start your course from a known departure you cannot hope to fetch the place or point sought. This is one of the most important factors in navigation, and too, it is one that is neglected every day.

OTHER BEARINGS ON THE SAME PRINCIPLE.

The student has probably already discovered the fact that the working

principle of the 4-point bearing will likewise hold good for any required number of points such as bearings 2, 3, 5, etc., points from the course, so long as the difference between first and second bearing is the same number of points or degrees as the difference between course and first bearing, and so it does. The rule then, as we have seen is: whenever the angle between the course and the object is doubled, the distance run in the interval is the distance off at second bearing. For example—First bearing 30° on the bow; second bearing 60° on the bow—difference in bearings 30°, or at second bearing the bearing is double the difference between the angle of the course and first bearing. The distance run between bearings is equal to the distance off at second bearing. Or, it may be stated thus. take a compass bearing of a light or other prominent object on shore, when it is 2, 3, 4, 5, 6, etc., points off the course. Take another bearing when it has doubled the first and is 4, 6, 8, 10, 12 points from the course. The distance run by the ship in order to double the first bearing will be her distance from the observed object at the second bearing. Note.—When you come to double a 6 or 7-point bearing, the ship will be so far from the object that it cannot be seen, unless, of course, it is a very lofty one.

TO DOUBLE THE BEARING.

The doubling up of the first bearing is on the principle again that equal angles give equal sides, that is, opposite the equal angles will be found the equal sides, or opposite the equal sides will be found the equal angles.

BY POINTS INSTEAD OF DEGREES.

Note.—It is convenient in navigation to call the angles by points instead of by degrees, thus 90° is 8 points, 180° is 16 points, and so on. As the sum of the three angles of every triangle is equal to 180°, it must also be equal to 16 points. The right angle of a triangle is equal to eight points; thus, take the 4-point bearing, the sum of the three angles equals 180°; the right angle is eight, the other two are each four points, which equals 16 points. In Fig. 4, which illustrates the 2 and 4-point bearings, the equal angles are each two points, the sum of which is four points and as there are 16 points to the three angles, the greatest angle (opposite the longest side) must equal 12 points.

EXPLANATION OF FIG. 4.

In Fig. 4, the ship at S steering north, finds the light at L bearing NNE, two points from her course. At B she finds it bears NE, four points from her course, or double the bearing between the course and first bearing. The log, or time, makes the distance from S to B seven miles; and this, therefore, will be the distance the ship is from the light, or the ship is seven miles SW of the light. This is called a 2-point bearing because it is two points from the course, and two points from first to second bearing.

WHEN THE ANGLES ARE ACUTE.

The weak spot in doubling a 2-point bearing is the acuteness of the angle. This is evident in the diagram, so that nothing more than approximate results can be expected. The 4-point bearing, for this reason, gives much better results than any other bearing whose angles are less than those contained in the right-angled isosceles triangle. Bear this in mind.

A WRINKLE WORTH KNOWING.

It is necessary at times to know how far you will be off a light, or point of land, when abreast before you get abreast. This can be determined by the 2-point bearing and the factor 0.7. Take the first bearing when the object is two points from the course, and run on the same course until the bearing of the object changes two points, or four points from the course; the distance run in the interval is the distance the vessel is from the object at second bearing. To determine the distance you would be off when abeam by keeping the same course, merely multiply the distance run between bearings by 0.7, which will give you the distance you would be off, were you abeam of the light, or the distance you will be off when abeam by steering the same course right through. Remember that this 0.7 can only be used for this 2-point bearing, for 2½, 3 or any other number of points it would be something else.

HOW IT IS DONE.

Thus, in Fig. 4, the vessel steering north finds by means of a 2-point bearing that at B (the place where first bearing has been doubled) the distance run in the interval is seven miles, which equals the distance that the ship is from the object at second bearing. At B she has the light bearing broad off the starboard bow and she desires to know that by keeping the same course at what distance she will pass the light when she has it on her beam. The distance run to change the bearing two points is the distance of the ship from the light at second bearing, which in this example is seven miles, and this multiplied by 0.7 equals 4.9 miles, the distance she will be off when abreast of the light by steering the same constant course; provided, of course, that current or leeway has not influenced her between bearings.

Supposing that you had to pass a point of land where a shoal extended out from it some three miles, and you wish in passing the shoal to give it a berth of two miles, or five miles from the point. You put the vessel on a course that ought to fetch her off this distance; and we will say that the course is S by E and you are making 12 miles an hour. At 2:10 the point of land bears S by W, or two points from the course; and at 2:40 the same point of land bears SW by S, or four points from the course or two points from first bearing, how far are you from the point of land, and what will be your distance off when abreast by keeping the same course? The time between bearings is 30 minutes, in which time the vessel has run six miles, and this multiplied by 0.7 gives 4.2 miles, the distance that she will be off when abreast by keeping the same course.

DEATH OF CHARLES ANDERSON.

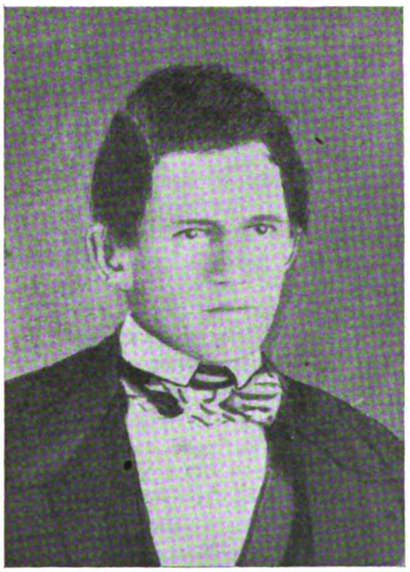
Nearly everyone associated with lake trade, especially vessel masters and engineers, grieved to learn the death of Charles O. Anderson, or Charlie as he was usually called, the boss rigger of the Upson-Walton Co., of Cleveland, which occurred on the last Sunday in August. Anderson had fitted out more vessels than any man in this country, numbering 200 in all. He was a Norwegian and had been sailing from boyhood, receiving his first experience in deep-sea sailing. He came to the lakes over twenty years ago and was mate on the schooners John O'Neil, Kimball and Melvin S. Bacon and the whaleback Sagamore. He left the Sagamore to enter the rigging department of the Upson-Walton Co. with which he was continuously connected thereafter until the day of his death. He rigged more schooners at Quayle's ship yard than any man on the lakes and when the evolution from sail to steam came he was equally active in superintending the fitting out of steamers complete. His death is greatly regretted.

Fire somewhat scorched the steamer Mecosta last week while lying at the Hanna ore docks at Sandusky last week. Oil tarpaulins spread out in the crew's quarters forward on the steamer ignited with a flash from a lantern.

EARLY USE OF LAKE SUPERIOR ORE.

John J. Spearman, of Sharon, Pa., is probably the oldest man living who, during his entire career, has been identified with the manufacture of pig iron in the United States. If his life is spared until Dec. 27 of this year, he will be 83 years old. The years have rested lightly on his shoulders, and he is still active, both physically and mentally, and daily performs the duties of president of the First National Bank of his home city.

Speaking of primitive practice and the changes which he encountered from the time he was a boy around



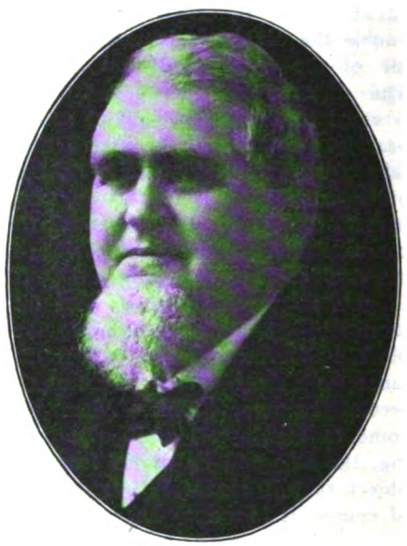
J. J. SPEARMAN WHEN HE WENT TO SHARON IN 1847.

the old cold blast charcoal furnaces in Pennsylvania, until the time opportunity reached out from west of the Allegheny mountains, through his experience with the old Sharon, Mazeppa, Sharpsville, and Wheatland furnaces, during the time he was at the head of the co-partnership bearing his name, and finally down to the modern practice of the present day, Mr. Spearman says a record would read more like a fairy tale than a recital of the progress of the great industry from its infancy to the stage at which he now looks upon it from his retirement.

Much has been said, and several controversies have arisen regarding the first successful use of Lake Superior iron ore in Ohio and Pennsylvania, but few of those connected with the business in those early days are still alive. The Sharpsville furnace, at the time Lake Superior ore was introduced into the Shenango valley, was owned by David and J. F. Agnew. The Clay furnace was owned by the Sharon Iron Co., of which General J. P. Curtis was president and Frank Allen manager. It is conceded that the first ore used in the valley was at the Sharpsville furnace, and at that time John J. Spearman was manager of this plant. The controversy does not relate so much as to which furnace, Clay or Sharpsville, first used the ore, as it does to which used it successfully. Frank Allen of Clay furnace admits the contention of Messrs. Agnew that the first ore was put through the Sharpsville furnace, but says that it was mixed in proportions of ¼ Lake Superior to ¾ native ores. David Agnew, in records left by him, claims the distinction of having been the first to work this ore successfully, but in this he is emphatically contradicted by Mr. Allen of the Clay furnace, whose contention was that a mixture with the native ores, and the comparatively small portion of Lake Superior ore used, could not be considered a successful test. He maintained that this ore was never successfully worked in a blast furnace at Sharpsville, Clay furnace, or elsewhere in the Shenango valley, until it was done at Clay furnace in the fall of 1856, after the stack had been rebuilt and six feet added to its height.

Mr. Spearman, as furnace manager of the Sharpsville furnace, states that in his experience, the first ore worked in the Shenango valley was at the old Sharpsville furnace, but that only a small quantity was used in the mixture with native ores, thus maintaining Mr. Allen's contention that the first Lake Superior ore worked alone was at the Clay furnace. It is admitted that Lake Superior ore used alone in the first practice was far from successful, it being hard on the furnaces until they were rebuilt to suit the peculiar requirements of this high grade ore. Speaking of the introduction of this ore in the Shenango valley, Mr. Spearman says that in 1855 the Cleveland Iron Mining Co. and the Jackson Iron Co. both of Cleveland, commenced shipments to lower lake ports and experiments were made by them in the Mercer valley district and in the vicinity of Sharon, New Castle and Sharpsville. Jacob Reese, recently deceased, was, according to Mr. Spearman, the first to try the experiment in the New Castle district where Lake Superior ores were used as "fetler," or "bull dog," and lining for knobbling furnaces, largely replacing the use of mill cinder and Lake Champlain ores.

Some interesting data on the early purchase price of Lake Superior ore are secured from the books of the Spearman Iron Co. In 1872, for a grade of ore, inferior to that secured in 1898, $12 per ton was paid. In 1898 Mr. Spearman, for the Spearman Iron Co., bought 12,000 tons of Lake Superior ore at $1.80 per ton delivered on Lake Erie docks, and according to his records of the monthly meeting of the furnace company held in March, 1898, he bought 40,000 tons at $2.35, 15,000 tons at $2.98, 10,000 tons at $2.48, 10,000 tons at $2.35, 5,000 tons at $2.45, all of a Bessemer grade, while on the same date he pur-



J. J. SPEARMAN.

chased 20,000 tons of non-Bessemer ore at $2.10 per ton, and 10,000 tons at $2.05.

MULHOLLAND HATCH FASTENER.

Since Capt. Mulholland brought out his hatch fastener four or five years ago, he has succeeded in introducing it not only on a great number of vessels on the lakes, but on coast vessels as well, and while his original fastener was designed with especial reference to wooden hatches, he has later developed it to include steel hatches as well. The Mulholland hatch fastener secures with one grip and with one operation the hatch cover, tarpaulin and batten. If anything gives way in a storm it is certainly not the fastener, for it has held hatch coamings and hatch covers together in storms that have torn the deck itself off the vessel. The hatch fastener is quick and easy of operation and is absolutely reliable.

Capt. Mulholland recently received an order from Mr. W. H. Becker to equip the steamer B. J. Jones with 250 sets of these fasteners. He has

also received a letter from Mr. Becker stating that he has found the hatch fastener satisfactory on all of his boats upon which they have been installed. Capt. Mulholland also values a letter from Mr. Sheadle, secretary of the Cleveland Cliffs Iron Co., who states that with the Mulholland device his captains informed him that they can fasten the hatches in half the time they could under former practice, and that they are also a saving on the hatch cloths, no eyelets to fray or rip. He has also received a letter from Capt. A. B. Drake, chief inspector of Inland Lloyds, who states that if the Mulholland fastener is properly adjusted he cannot see any use for the long cross bars over the covers. Capt. W. C. Richardson wrote to say that he found the fasteners to be the best that he had ever seen. John Ubsdell Jr., superintendent of the hull department of the Great Lakes Engineering Works, finds the fastener very satisfactory both on wood and steel hatch covers and considers it unsurpassed in security, durability and simplicity. Further endorsements were received from Capt. C. A. Benham, Capt. Thomas Wilford, Capt. E. J. Burke, Capt. C. H. Francke, Capt. Henry Peterson, Capt. D. Garardin Jr., and James Davidson and Henry Wineman Jr.

UNCHARTED SHOAL.

The United States lake survey steamer Search, which is engaged in sweeping the north end of Lake Michigan, reports the discovery of an uncharted shoal about half a mile long and 1,000 ft. wide, lying six miles northwest ¾ north from St. Helena island, with least depth at low water of 16 ft. Also, a second shoal extending out about two miles westerly from Point aux Chenes, with a depth of 14.5 ft. one mile offshore, and five miles from St. Helena island. These are both boulder shoals, and dangerous to vessels taking the lee of the shore.

WRECK NEAR COLCHESTER LIGHT.

The United States lake survey steamer General Williams, engaged in sweeping the west end of Lake Erie, reports the discovery of a wreck lying in 36 ft. of water two miles north 66° 10′ east of Colchester light, having 23.4 ft. of water over it at the present high stage of the lake. This lies close to the main traveled track covered by the through freighters between Pelee Passage and Detroit river taking the north side of Colchester light. Under ordinary weather conditions vessels with present draughts may safely pass over this wreck, but in the fall of the year with westerly gales blowing, the west end of Lake Erie lowers from 3 to 6 ft. with a heavy sea rolling. At such times this wreck is a dangerous obstruction. The wreck has been temporarily marked by a spar buoy flying a white flag with a red center.

FINE GRAIN CROP.

Statistics just compiled by the Duluth Board of Trade show that the crop year from August, 1905, to July, 1907, was the second largest in the history of the city. Following are the receipts and shipments of grain at Duluth-Superior for the crop year from Aug. 1, 1906, to July 31, 1907, and comparison with year from Aug. 1, 1905, to July 31, 1906:

TOTAL RECEIPTS OF ALL GRAINS.

	1906-07.	1905-06.
August	2,629,615	2,336,030
September	11,143,594	10,785,357
October	18,306,478	17,653,702
November	17,358,255	15,722,372
December	7,590,638	7,943,455
Total 5 months	57,028,580	54,440,916
January	2,235,303	5,680,865
February	2,072,123	2,345,482
March	4,796,605	3,882,335
April	8,970,734	3,278,149
May	6,824,485	2,007,869
June	2,696,762	2,454,539
July	4,635,511	5,106,672
Total	89,260,103	79,196,827

TOTAL SHIPMENTS OF ALL GRAINS.

	1906-07.	1905-06.
August	6,354,171	2,582,984
September	7,245,668	6,844,535
October	15,449,286	13,677,657
November	15,274,889	12,440,904
December	11,419,198	12,293,887
Total 5 months	55,743,212	47,839,967
January	556,280	575,471
February	439,035	1,318,447
March	384,333	141,126
April	4,946,717	8,244,881
May	10,684,200	6,464,647
June	5,323,279	5,167,399
July	8,586,412	5,974,526
Total	86,663,468	75,725,864

RECEIPTS.

	1906-07.	1905-06.
Wheat	52,827,343	38,143,118
Corn	129,237	256,392
Oats	4,608,410	11,924,292
Rye	653,643	644,726
Barley	10,449,849	11,083,087
Flax	20,591,621	17,145,212

SHIPMENTS.

	1906-07.	1905-06.
Wheat	48,057,950	31,592,238
Corn	136,107	259,211
Oats	5,270,528	11,735,007
Rye	730,820	638,712
Barley	10,864,116	10,869,475
Flax	21,603,947	20,631,111

SUBMARINE SIGNALING.

The following letter received from the Dominion Line Steamer Canada reads:

"I wish to report that on the Canada's homeward passage ending July 15, 1907, we had thick weather up channel, and approaching N. W. ship, we heard the bell sounding at a distance approx. of 15 miles, and were thus enabled to steer with confidence for the ship, which was in sight when the fog lifted, exactly where we expected to see it."

THOMAS HATTON, Chief Officer.

Capt. H. Osterhaus, commanding United States Steamer Connecticut, on Aug. 7, when approaching South Shoal light vessel, heard the first sound of the submarine bell at a distance of eight miles, and at a distance of four and one-half miles the code number was distinctly recognized. This was the captain's first experience with the bell and was most satisfactory and encouraging.

The steamers Koenigin Louise, Prinzess Irene and Koenig Albert of the North German Lloyd, and the steamers Moltke and Hamburg of the Hamburg-American Line, are being equipped with the sound-receiving apparatus.

ELECTRICAL APPARATUS ON BATTLESHIPS.

The first battleship to be propelled by turbine engines is now in course of construction in the Fore River Ship Building yards at Boston. This big battleship, No. 29, will be equipped with Curtis steam turbines with a total capacity of 25,000 H. P. The high efficiency of these turbine engines, the absence of reciprocating parts, vibrations and consequent strains are expected to make this battleship the speediest in the navy.

The electrical apparatus on No. 29, and a sister ship to be built by the Newport News Ship Building Co., has been contracted for with the General Electric Co. The generating sets for supplying light and power on both the ships will be driven by small Curtis turbines. Four 300-kilowatt turbo-generating units will be installed on each ship. Approximately 100 motors, of from 2 to 50 H. P., will be used to operate the auxiliaries, including the forced draft fans, hull ventilation, turret turning, ammunition hoists, winches, cranes, laundry and workshop motors. The battleships will also be equipped with four 30-in. and four 60-in. searchlights.

The Curtis steam turbine is best known in the electrical field in connection with the various types of General Electric turbo-generators, of which nearly a thousand units, aggregating over a million horsepower, have been installed during the past four years.

ON OUR QUARTER-DECK.

The MARINE REVIEW acknowledges a pleasant call from Capt. J. V. Trowell, master of the freight and passenger steamer City of Ottawa, of the Merchants Montreal line, operated by the Montreal & Lake Erie S. S. Co. The City of Ottawa was formerly the Anchor line steamer India. Regarding the tabulated statement "Accidents to Lake Vessels," published in the MARINE REVIEW, Aug. 8, in which the city of Ottawa is mentioned as having collided with a Cleveland bridge, Capt. Trowell explains that it merely scraped its protection structure. The bridge was not damaged in the least from the slight squeeze it received and the extent of the injury to the steamer was about two brushfuls of paint scraped off her side. Capt. Trowell reports that his company is doing a very prosperous business with its new boat and that the trade is much pleased with the services rendered by this arrangement. Capt. Trowell is one of Canada's progressive lake skippers, and a man that keeps pace with the demands and requirements of his calling in every particular.

Capt. Geo. H. Banker, of the steamer W. R. Linn, has very kindly called the MARINE REVIEW's attention to a slight error in the Marine Review Course Finder. On page 57, under the heading "Port Huron to Green Bay—Using Cleveland Ranges," East Pierhead light should read West Pierhead light. It is in the third line and the fourth word, dealing with the course from Port Sanilac to Harbor Beach. As will be noted on page 33 of Course Finder under heading "Correct Magnetic Bearings at Cleveland," and also by chartlet on page 72, that the correct magnetic bearing of East Breakwater light in range with East Pierhead light is NNW and SSE, while the correct magnetic bearing of the East Breakwater light in range with West Pierhead light is N ⅞ W and S ⅞ E. To make the mean correct magnetic course of N x W ⅛ W, from Port Sanilac to Harbor Beach, starboard ¼-pt. from the course shown with stern of boat in range with the East Breakwater light and the West Pierhead light. This course by compass, whatever it may be, is equal to a correct magnetic course of N x W ⅛ W, because the range is N ⅞ W and by starboarding ¼-pt. makes N x W ⅛ W. Your compass will not say N x W ⅛ W, unless there is no deviation for this heading, but no matter what it does say it is equal to a correct magnetic course of N x W ⅛ W. Cleveland Waterworks Intake crib in line with the Old Intake crib has the same correct magnetic bearing as East Breakwater and the West Pierhead lights when in range with each other. This range may be used instead of the East Breakwater light and the West Pierhead light. At first sight this error appears more glaring than it really is. It apparently takes in the first four courses from "Port Huron to Green Bay," but in reality it only deals with the first two; for in changing the range from East Breakwater light to West Pierhead light explains the trouble at once. It is the aim of this office to make the Course Finder absolutely correct and reliable and the author's efforts are constantly bent toward the attainment of this result. It can be attained if all those who use the publication will report all errors observed so that they can be corrected through the bulletins to be published later on, provided these errors are numerous and serious enough to warrant this. However, no pains will be spared in making the work thoroughly reliable.

Capt. John Smith, master of the steamer Mars, and one of the foremost lake skippers, is among those who have endorsed the Marine Review Course Finder. Capt. Smith is probably one of the most conservative men sailing the lakes as commander today, so that his endorsement means a great deal. Capt. Smith is not one who takes up with every "gimcrack" method that happens along, but if such method is really "gimcrack" Capt. Smith would be one of the first to realize it. Capt. John says that as an auxiliary to azimuths the Course Finder is an absolute necessity. It takes the place of azimuths when azimuths can not be utilized, and when azimuths can be utilized the Course Finder acts as a check in verifying the work performed by the master. It is a difficult matter to keep track of a ship's compasses under the most favorable circumstances, so that any method that will assist in relieving this difficulty, even in a small way, must meet with the endorsement of all right-minded men. Therefore, the Course Finder and its auxiliaries must eventually find their way on board every ship.

Capt. Duncan Buie, of the steamer Lake Shore, and Mate J. E. Yax, of the steamer Mariska, were among the nautical visitors to the MARINE REVIEW office while their respective ships were in port. Both men expressed their appreciation of the practical utility of the Course Finder and Deviation Log.

The MARINE REVIEW extends a special invitation to every man aboard ship to call and inspect its nautical department when in Cleveland. Masters and mates are especially invited to review the publications designed for their benefit, such as the Course Finder, Deviation Log, Deviation Diagram of the River Ranges, How to Draw the Deviation Curve, the Course and Bearing Corrector, etc., etc. The author of these publications will go over them and explain everything in detail. This service is free. The management of this department is confident that these works are not only of practical value to the men aboard ship but that they are essentials in the safety of the ship as well. It is the MARINE REVIEW's opinion that the owner should provide these as necessary equipment for his boat, in the same manner that charts, etc., are provided. Some owners put the outfit aboard their boats without the least hesitancy, while others put it up to their masters. In this opinion the MARINE REVIEW has been sustained by many masters. Those masters who have had the opportunity of seeing the work have not hesitated in procuring it themselves. It is for this reason that the MARINE REVIEW urges the men aboard ship to pay this office a visit in order to get familiar with the work so that they will be in a position to explain same intelligently to their owners. The MARINE REVIEW is almost positive that when the work becomes generally known that it will become generally utilized, and that it will help in relieving the master of many responsibilities is only too apparent. No master can be provided with too many good tools to work with, and that these are good tools is the verdict of those masters who have had the opportunity of using them practically. This department is not only for the purpose of promoting its own books and nautical devices, but it is also for the purpose of furnishing any and all information belonging to such a department. The office of the MARINE REVIEW is located at the corner of Erie and Bolivar streets on the third floor of the Browning building.

M. F. Sweeney, chief engineer of the steamer Wawatam, has been promoted to chief engineer of the steamer Crescent City. E. J. Fitzgerald, formerly chief engineer of the Crescent City, has resigned to accept a position ashore at Detroit. Myron Sweet has been appointed chief of the Wawatam temporarily.

ATLANTIC COAST GOSSIP.

Office of THE MARINE REVIEW,
Room 1005 West St., Bldg.,
New York City.

Though the officials of the Cunard Line say that no race is comtemplated, still the officers and crews of the Lusitania and Lucania seem to take a different view of the matter, and the shipping world looks forward to the termination of the contest between the past record holder and the new record breaker with interest.

The wireless reports received occasionally make known the position and condition of the vessels, and many hours before the ships are sighted we will know to a minute the time of arrival off the hook.

It would be interesting to speculate what the probable result of the contest would have been had there been no installation of wireless telegraphy on either of the vessels. Out of range of vision and signaling it would be impossible for either ship to communicate her hours of reduced speed in fog or heavy weather, stoppage and the cause thereof, each driving ahead entirely ignorant of the efforts of the other.

The arrival of the latest in big and fast ships in New York always creates some little excitement. Yesterday we awaited the arrival of the Kronprinzessin Cecilie, today she is one of the many. When the Lusitania has come and gone, the Mauritania will come up to the front.

The Merritt & Chapman Wrecking Co., occasionally handle some unique contracts around New York harbor. Last week the wrecker William E. Chapman raised from the bed of the East River a big $7,000 automobile which leapt from the ferryboat Maine. The machine was hoisted in just one hour, a diver going down to pass some slings around the wheels. Needless to say, there were the usual number of curious spectators.

There arrives at New York this week the new Austro-American Liner Alice. The Alice is sister ship to the Laura, which recently arrived in this port, is of 10,000 tons, 430 ft. in length, and 50 ft. beam. She was launched at Glasgow in April, 1907, and is expected to be the fastest boat of the line. She sailed from Trieste on August 26.

New Bedford, Mass., is reviving her whaling industry. Three vessels have sailed from that port in the last ten days for the whaling grounds. The brig Sullivan arrived last Tuesday, after a twenty-seven months' cruise, with 3,300 barrels of oil.

It is some comfort to know that the protests against the dangerous manner in which motor boats and other small craft are being operated are not confined to New York harbor alone, but are coming from all over the country. In the opinion of Assistant Secretary Murray they will be fully covered by the proper enforcement of existing regulations. Well, they have been out after scalps in this vicinity for some weeks now.

There was no cessation of the supply of shipping news from New York last week, in spite of the fact that the Ship News Office of the various newspapers was completely wrecked by fire. The office was a two-story frame house, the top floor of which was occupied by the Marine Hospital. All the telephone apparatus was wrecked.

The overdue American-Hawaiian Line steamship Nebraskan arrived at Salina Cruz, Mexico, on Friday last. The Nebraskan left the Hawaiian Islands on Aug. 13 for Salina Cruz with a cargo of sugar valued at over $500,000 to be transported via the Tehuantepec route to Philadelphia. The distance from the Hawaiian Islands to Salina Cruz is 3,300 miles, which should have been made with an eleven-knot speed in thirteen days.

Though it is some compensation for the crew of the armored cruiser New York to know that the new name for their ship will be one equally famous, the Saratoga, it must be consoling to the navy department to know that the superstitious fears of the blue-jackets won't prevent their "signing on."

At Newport, R. I., tests have been made of an invention by Henry Stenfieben, a Frenchman, of a device to render useless submarine mines planted by the enemy. The device, the nature of which has been kept secret, is understood to consist of a mechanism operated by magnetic power. It now remains for another inventor to devise a mechanism for rendering useless this useless rendering device.

The Swedish war vessel Fylgia was opened to the visiting public on the Sunday of her stay in New York with the usual result. Though the guns and machinery remained intact, the souvenir hunters got everything portable. They now await the arrival of our next visitor.

The British tramp steamer Dalton Hill arrived at Philadelphia on Friday from New York in ballast to load an outward cargo for Rotterdam on the account of the Holland-American Line.

The British tramp steamer Nicaraugan, from Port Tampa, June 3, and Norfolk, June 8, for Dublin, has been posted at Lloyds as missing. The loss of this vessel and all hands, numbering over forty, is one of the most serious affairs reported in shipping circles for some time.

The report of the boarding officers of the Customs service, which includes all foreign vessels from both foreign and coastwise ports, and all American vessels arriving from foreign ports, shows that for the month of August 150 vessels bound for Philadelphia were boarded and examined by the officers, a month's work unprecedented heretofore.

The Brisith steamer Chesapeake left Philadelphia last week with 1,700,000 gallons of petroleum and lubricating oil for Calcutta. The cargo is carried in separate tanks in bulk.

The new steamship Olsen and Mahoney, built at Wilmington by the Harlan & Hollingsworth Company for use in the Pacific Coast lumber trade, left Wilmington for Baltimore to load coal for San Francisco.

That there is many a slip twixt the cup and the lip is again demonstrated. There arrived at the New York office of the MARINE REVIEW last week one of these neat little wedding cake boxes, mailed from England. We eyed it and smiled blandly, but, on picking it up found a one-inch hole in the corner thereof. On the bottom of the box was the following pathetic inscription:

Received in bad condition.
Eaten by Rats on
S. S. Adriatic.

RENDALL'S TRAGIC DEATH.

On Thursday last Chief Engineer J. Y. Rendall, of the steamer City of Erie of the Cleveland & Buffalo line, was badly scalded while making repairs to one of the steamer's boilers. He was taken to the Marine hospital where for a few days his recovery seemed hopeful, but he died on Wednesday morning. Mr. Rendall was forty-nine years old and came to this country from Scotland when a young man. He was a finished sailor in every way, having served before the mast before he entered the engine department. He entered the employ of the Cleveland & Buffalo Transit Co. when it was formed in 1892, and was made chief engineer of the steamer State of Ohio. He passed successfully to the better ships and was chief engineer of the City of Erie when she won her famous race over the Tashmoo. He leaves a widow and four children.

SHIP YARD NOTES.

Jacob S. Ellis & Son are building a tug at their Tottenville, Staten Island, plant to the order of W. S. Limond, Produce Exchange, New York.

The Spedden Ship Building Co., Baltimore, Md., has been awarded the contract for giving light vessel No. 46 a general overhauling and repairing.

The steamers Shasta and Saginaw, building for the Pacific Lumber Co., San Francisco, are progressing rapidly at the yard of the Matthews Ship Building Co., Hoquiam, Wash.

A recent incorporation for the purpose of building vessels is that of E. H. Godshalk & Co., Camden, N. J., with a capital of $100,000. C. A. Godshalk, R. B. Clark and others are interested.

The contract given to the New York Ship Building Co., Camden, N. J., by the Gulf Refining Co., is for the largest oil tank vessel ever built for service across the Atlantic and on the coast.

The work of erecting the plant at the new ship yard of the Hartford & New York Transportation Co. at Hartford, Conn., is well in hand and the main building is progressing rapidly.

The five-masted schooner Elvira Ball was launched from the yard of the Gilbert Transportation Co., Mystic, Conn., last week. The schooner is 246 ft. long, 40 ft. wide and 15½ ft. deep.

The six-masted schooner Mertie B. Crowley was launched at Rockland, Me., on Saturday last for the Coastwise Transportation Co.'s fleet. The Crowley is 296 ft. long, 48 ft. beam and 28 ft. deep.

The Greenport Basin & Construction Co., Greenport, N. Y., has been awarded contract for the construction of a steamer for Wesley B. Smith, of Baldwin, N. Y., for delivery in November of this year.

The Panama Railroad Co.'s steamship Allianca was recently lengthened 36 ft. at the yard of the Cramp Ship & Engine Building Co., Philadelphia. She was built at the Roach ship yard, Chester, Pa., in 1886.

The Bath Iron Works, Bath, Me., are progressing rapidly on the hull of the turbine steamer Belfast, which they are building for the Eastern Steamship Co., of Boston, the work of plating being almost completed.

The four tugs for the Standard Oil Co. which are under construction by the Skinner Ship Building & Dry Dock Co., Baltimore, Md., will be known as S. O. Co. Nos. 16, 17, 18 and 19. These tugs are approximately 100 ft. in length.

The Detroit River Transit Co. has purchased the wooden steamer John Otis from Wilson & McMillen, of Muskegon, Mich. The Otis will be converted into a sand steamer and will carry sand for the Michigan Central tunnel at Detroit.

The United States gunboat Wilmington, stationed in Asiatic waters, reports to the navy department that July 29 three men were fatally scalded. The accident occurred at Nanking, through the bursting of a boiler tube China.

The Bay State Fishing Co., T Wharf, Boston, is reported to have asked for bids from the Fore River Ship Building Co., Quincy, Mass., and also from a Philadelphia concern, for the construction of a steam trawler similar to their fishing steamer Spray.

The machinery of the new steamboat Portchester, built by A. C. Brown & Sons, Tottenville, Staten Island, N. Y., was built and installed by John W. Sullivan, foot of East Ninth street, New York. She is to run between New York and Portchester, on Long Island sound.

I. L. Snow & Co., Rockland, Me., recently launched the three-masted schooner Wawenock, built for themselves to ply in the coal, stone and lumber trades. Her dimensions are as follows: Length 135.9 ft., breadth 34.3 ft., depth 9.8 ft. She has a gross tonnage of 325, her net tonnage being 258.

The work of permanently repairing the steamer Herman Winter, owned by the Metropolitan Steamship Co., Bath, Me., will be done by the Fore River Ship Building Co., Quincy, Mass. New plates and frames are to be put in and some changes will also be made in her interior fittings.

The steamer building by the Newport News Ship Building & Dry Dock Co., Newport News, Va., for the Hammond Lumber Co., San Francisco, will be named George W. Fenwick. She will be launched in a short time. The vessel is 276 ft. long and 42 ft. beam, with a capacity for 2,250,000 ft. of lumber.

The six-masted schooner Mattie B. Crowley, built by Cobb, Butler & Co., Rockland, Me., to the order of the Coastwise Transportation Co., Boston, Mass., was launched Aug. 24. She is to be engaged exclusively in the coal trade. The dimensions are: Length, 296.5 ft.; breadth, 48.4 ft.; depth, 28 ft.; gross tonnage, 2,834.

The Moore & Scott Iron Works, San Francisco, Cal., were the successful bidders for the work of repairing the United States army transport Buford, the amount of the bid being $5,200. The bid of the Union Iron Works, San Francisco, was $5,666 and that of the United Engineering Works, of the same city, was $6,558.

The keel of the first sailing vessel ever built in Nova Scotia, and probably the first in the maritime provinces, has been laid by I. Matheson & Co., New Glasgow. She is to be a three-master with a length on the keel of 131 ft. and is of 400 gross tonnage. The vessel is being built for the firm of Carmichael & Co., New Glasgow.

The schooner Myrtle Tunnell, formerly owned by Capt. George B. Tunnell, Philadelphia, and which was sold after being towed into Savannah in a waterlogged condition, has been again put in commission after an extensive overhauling and repairing at the yard of Tietjen & Lang, Hoboken, N. J. Her name has been changed to Forest City.

The work of putting the new propellers on the new turbine steamship Creole, of the Southern Pacific Co., has been completed by the Fore River Ship Building Co., the builders of the vessel. The stern dock was removed last Thursday and this week the ship will leave the Fore River works at Quincy, Mass., for a test of the new propellers.

The steam schooner Shna-Yak, built by the Hall Bros., Eagle Harbor, Wash., for George E. Billings, San Francisco, was launched Aug. 7. The Shna-Yak is 195 ft. long, 39.6 ft. beam and 14 ft. depth of hold. She is to have triple-expansion engines and Scotch boilers. She will ply in the coastwise trade and has a capacity of 1,000,000 ft. of lumber.

When the steamship Satilla, owned by the Brunswick Steamship Co., Brunswick, Ga., went to the Fore River Ship Building Co.'s yard, Quincy, Mass., recently for repairs she carried a cargo of nine boilers for the three colliers building at that plant for the New England Gas & Coal Co. These boilers were built at Buffalo and transported to New York on canal boats. The Satilla was built by the Fore River company.

The tug E. G. Reynolds, built by John H. Dialogue & Son, Camden, N. J., for E. G. Reynolds, 119 Walnut street, Philadelphia, Pa., has been delivered to her owner and is now in commission. She is built of steel throughout and is 115 ft. long, 23½ ft. beam, molded, and 13 ft. depth of hold. She is fitted with triple-expansion engine, 13, 21 and 32 in. by 24-in. stroke. A Scotch boiler, allowed 180 lbs. pressure, supplies the steam.

If sufficient capital can be secured it is probable that a modern ship building plant will be erected in New Orleans shortly. Mr. J. C. Febriger Jr. is now endeavoring to secure subscriptions to the enterprise, which will have a capital stock of $30,000. The location selected is an island in Bayou St. John affording a sheltered harbor of 1,200 ft. The main channel of the bayou will accommodate vessels drawing water up to 10 ft.

The Maryland Steel Co., Sparrow's Point, Md., was the only bidder for the construction of a revenue cutter for the government. The appropriation amounted to $170,000 but as the company's bid exceeded that amount the contract was not awarded. The vessel will be 152 ft. long, and is designed for use on the New Bedford, Mass., station.

The ship yard of W. A. Boole & Son at Oakland, Cal., has been sold for the sum of $650,000, presumably to the Western Pacific Co. The tract is adjacent to the recent acquisition of the Western Pacific Co. and consists of thirteen acres, which when joined with the other property will afford the largest wharf frontage under the control of one company in Oakland.

Cramp & Sons Ship & Engine Building Co., Philadelphia, are to install four new Scotch boilers in each of the Morgan line steamships El Paso, El Monte and El Dorado, which are engaged in the New York-New Orleans service. Four of these boilers are to be built by the Harlan & Hollingsworth Corp., Wilmington, Del. The vessels have steeple compound engines.

Edwin S. Cramp, who lately retired from the Cramp Ship & Engine Building Co., Philadelphia, has associated with himself George W. Norris, of the banking house of Edward B. Smith & Co., Philadelphia, in the purchase of a piece of property fronting 1,000 ft. on the main harbor and 1,000 ft. on Pescara creek, at Norfolk, Va., which has a depth of water of from 25 to 30 ft. The purchase price was $95,000. One of the largest ship building plants in the country is to be erected on the property.

The work of repairing the steamship Herman Winter of the Metropolitan Steamship Co., of Boston will be done by the Fore River Ship Building Co. of Quincy. The Herman Winter was damaged in a recent collision and temporary repairs having been made she is now back in her regular New York service. She will be sent to the Fore River Works about Sept. 1, when new frames and plates will be put in and some interior furnishings will be fitted.

The steamship Allianca, owned by the Panama Railroad Company, is at Cramps, Philadelphia, to be lengthened 36 ft. The work of pulling the fore and aft sections of the steamship thirty-six feet apart was accomplished in three minutes and five seconds from the time the last bolt had been loosened and the steam windlass started. The 36 ft. added to the Allianca will not merely increase the tonnage of the vessel, but this, adding to the capacity of her bunkers, will give the boat a greater steaming radius. She was built at the Chester yards in 1886.

CONSTRUCTION WORK.

Mr. F. C. Stevens, superintendent of public works, has awarded two additional contracts in the enlargement of the Erie canal. The first is known as contract No. 14 to Arthur W. Luce, 100 Broadway, New York, for $2,935,763; and the second known as contract No. 35 to the Gilmour-Horton-Allen, of Sandy Hill, for $739,261. Contract No. 14, which is 15 miles long, is located partly in three counties, Saratoga, Schenectady, and Montgomery. The work includes dredging a channel in the Mohawk river from a point near Crescent to a point near the Upper Mohawk aquaduct at Rexford Flats, and the construction of dams No. 2, 3, 9, 10 and 11, and locks No. 7, 13, 14 and 15 at Visschers Ferry, Yosts, Canajoharie and Fort Plain. Contract No. 35 involves the excavation of the Oswego canal between Utica street bridge and the harbor line north of the bridge at Oswego, including the construction of various locks and spillways.

Supt. F. C. Stevens, of the state department of public works, Albany, N. Y., has awarded the contract for the enlargement of the Erie canal from Oneida lake westerly to Mosquito Point bridge on the Seneca river to the Stewart, Kerbaugh & Shanley Co. of New York at $3,395,766.

The Boston & New York Construction Co., Boston, Mass., has been awarded contract for filling in back of quay wall at Portsmouth, N. H., for the sum of $37,844.

The contract for the construction of the Ashokan dams in the Catskills has recently been awarded by the board of water supply of the city of New York to the MacArthur Bros. and Winston & Co. for the sum of $12,699,775.

AWARD FOR DREDGING IN POTOMAC RIVER.

General Mackenzie, chief of engineers, has authorized Major Crosby, U. S. army, corps of engineers, in charge of the improvement of the Potomac river, to accept the bid of the Maryland Dredging & Construction Co., Baltimore, Md., for dredging in the Potomac and Anacostia rivers. The projected improvements include the dredging of 400,000 cubic yards of soft material from the Virginia channel; 600,000 cu. yds. from the tidal reservoir; 700,000 cu. yds. of soft material from the Anacostia river, and 21,000 cu. yds. of hard material from this channel. The bid of the successful concern for the entire project was $170,000, or at the rate of 10 cents per cubic yard for dredging on the Virginia channel; 9½ cents for dredging in the tidal reservoir and the Anacostia river, and 20 cents per cubic yard for the dredging of the hard material in the Anacostia river.

The total amount available for these improvements is $220,000.

RECLAIMING THE JERSEY MEADOWS.

The United States war department has recently begun the task of dredging a channel from the sea to Newark, N. J., so as to make that port available for vessels of deep draught, by the way of the Kill von Kull, Newark Bay and the Passaic river. The spoil is to be dumped upon the adjacent meadows, and will amount to 4,000,000 cu. yds. The work is under the direction of Col. Daniel W. Lockwood, corps of engineers, and the contract for the work is held by the Midland Land & Improvement Co., 62 Cedar street, New York, while the P. Sanford Ross Co., Jersey City, N. J., has been engaged by the city of Newark for undertaking the city's share of the work.

CANAL CIRCULAR NO. 387.

The Isthmian canal commission in Circular No. 387 calls for bids on a variety of supplies, to be opened in the office of H. F. Hodges, general purchasing officer of the commission, Sept. 18. Among the items are the following: 11 pneumatic hammers, two pneumatic piston drills, one pneumatic riveter, one yoke riveter, one pneumatic geared hoist, five electric drills, 500 boiler tubes, 500 brass condenser tubes, 16 gross water gage glasses, 26 pairs spruce oars.

BID FOR DREDGING WEYMOUTH BACK RIVER.

There was but one bid received and opened Aug. 20 in the office of the U. S. engineer at Boston, Mass., for dredging in Weymouth Back River, that of Simon J. Donovan, 87 Border street, East Boston, Mass, at 33 cents per cubic yard.

The W. & A. Fletcher Co., Hoboken, N. J., are engaged in the construction of machinery for four new vessels, one set being for the new steamer of the Citizens line to Troy, one for a Staten Island ferry boat, one for a steamer for the People's line to Albany and one for the Lake George Steamboat Co.'s vessel. The machinery of the Clyde liners Carib and Algonquin is also receiving a thorough overhauling at this establishment.

ACCIDENTS OF A MONTH

The accidents to lake vessels during the month of August have been equal in number to the large lists of the earlier months of navigation. The shoal at the entrance to the Buffalo breakwater comes in for many anathemas on the part of vessel owners and sailor men generally, the stranding of four steamers there having brought it into limelight, while the ever precarious navigation of the rivers has again been demonstrated by the number of collisions which have occurred in them of late.

These mixups included that of the steamer Henry W. Oliver with the steamer Ericsson and barge Manila in the Detroit river, in which the Oliver received the more serious damage, although the barge was injured to a very considerable extent.

The steamers A. G. Brower and Isaac L. Ellwood figure in a collision off Bar Point, Lake Erie, this accident having been reported to be due to defective steering gear on the Brower.

DATE.	NAME OF VESSEL.	NATURE OF ACCIDENT.	PLACE.
Aug. 5	Str. Oscoda	Lost wheel; dry docked at Manitowoc	Point des Morts Passage.
Aug. 6	Sch. Melitta	Stranded; released uninjured	Chambers Island.
Aug. 6	Str. Manistee	Broke wheel; repaired at Milwaukee	Ludington, Mich.
Aug. 7	Str. Arabian	Ran aground; released	Lake St. Francis.
Aug. 7	Str. Lizzie Madden	Ran aground; released	Niagara river.
Aug. 7	Bge. Theo. Wall	Ran aground in tow of Str. Madden; released	Niagara river.
Aug. 7	Str. G. J. Grammer	Struck bottom; 12 plates damaged; dry docked at Cleveland	Sailor's Encampment, Sault.
Aug. 8	Bge. Golden Age	Ashore; released uninjured after lightering	Limekilns Crossing.
Aug. 8	Str. Ceaster	Destroyed by fire	Goderich, Ont.
Aug. 9	Str. Frank Rockefeller	Machinery disabled; repaired at Two Harbors	Two Harbors, Wis.
Aug. 11	Sch. Montpelier	Sprung aleak; sunk	Detroit river.
Aug. 11	Bge. Antrim	Aground in Cuyahoga river; released	Cleveland, O.
Aug. 12	Str. W. H. Gratwick	Aground on shoal; released after lightering	Buffalo breakwater.
Aug. 12	Str. D. C. Whitney	Ran aground; released herself	Racine, Wis.
Aug. 13	Sch. A. W. Luckey	Struck bridge; slightly damaged	Chicago, Ill.
Aug. 13	Tug Abbott	Damaged by fire while at repair yard	Cleveland, O.
Aug. —	Str. Northern King	Struck obstruction; damaged bottom	Duluth.
Aug. 14	Str. E. W. Ogdebay	Ashore in fog; 26 plates damaged; dry docked at Toledo	Point Abino, Lake Erie.
Aug. 14	Str. Sir Henry Bessemer	Aground; released uninjured	Sandusky harbor.
Aug. 15	Str. Hiawatha	Sprung aleak; run ashore; pumped out and dry docked at Manitowoc	Lake Michigan.
Aug. 15	Str. Uranus	Struck on breakwater shoal	Buffalo.
Aug. 15	Str. Orion	Went ashore; total loss	Calf Island, Lake Ontario.
Aug. 15	Str. Chicago	Struck breakwater in fog	Sheboygan, Wis.
Aug. 16	Str. Majestic	Missed channel; aground; released	Sandusky.
Aug. 17	Str. Utica	Explosion in cargo; slightly damaged	Buffalo.
Aug. 18	Sch. Alice B. Norris	Went ashore; released; slightly damaged	Washburn, Wis.
Aug. 18	Sch. S. J. Tilden	Went ashore; released; slightly damaged	Washburn, Wis.
Aug. 18	Sch. Quickstep	Ran into tug Maxwell while being towed into port; slightly damaged	Sheboygan.
Aug. 18	Tug A. Maxwell	Run into by Sch. Quickstep; badly damaged	Sheboygan.
Aug. 19	Str. Majestic	Grounded; picked up boulder; dry docked at Milwaukee	Sandusky.
Aug. 19	Str. Bulgaria	Damaged rudder; repaired at Cleveland	Cleveland.
Aug. 19	Str. Henry W. Oliver	Collided with Str. Ericsson; went aground; eight plates damaged; docked at Buffalo	Detroit river.
Aug. 19	Str. Ericsson	Collided with Str. Oliver; went aground; slightly damaged	Detroit river.
Aug. 19	Bge. Manila	Collided with Str. Oliver while in tow of Str. Ericsson; bow badly damaged; repaired at Toledo	Detroit river.
Aug. 20	Str. Winnipeg	Broke wheel; dry docked at Buffalo	Niagara river.
Aug. 20	L. H. tender Crocus	Struck pier; several plates damaged	Buffalo.
Aug. 20	Sch. Santiago	Sprung aleak; sank at dock; raised and taken to dry dock at Milwaukee	Escanaba, Mich.
Aug. 20	Car Ferry Huron	Sunk while tilted for repairs; raised	Windsor, Ont.
Aug. 21	Tug S. W. Gee	Turned turtle; raised; slightly damaged	Blackwell canal.
Aug. 22	Str. City of Detroit	Collided with Bge. Harold; stem twisted	Detroit river.
Aug. 22	Bge. Harold	Collided with Str. City of Detroit; badly damaged; dry docked at Detroit	Detroit river.
Aug. —	Str. Alex. Nimick	Sprung aleak; dry docked at Cleveland	
Aug. 22	Str. Peerless	Engine wrecked by broken eccentric rod; steamer towed to port	Lake Michigan.
Aug. 23	Str. Mary	Burned to water's edge	Holland, Mich.
Aug. 23	Tug E. T. Carrington	Sprunk aleak; sunk; total loss	Lake Superior.
Aug. 23	Tug Edna G.	Crushed against dock by Str. Alva; dry docked	Duluth.
Aug. 24	Str. S. M. Clement	Grounded; released after lightering; uninjured	Buffalo.
Aug. 24	Tug Watson	Sunk at dock	Port Huron, Mich.
Aug. —	Str. John Sherwin	In collision; badly damaged	Sault river.
Aug. 26	Str. King Edward	Struck reef; 15 plates damaged; dry docked at Ecorse	Sault river.
Aug. 26	Tug Alfred W.	Engine went through itself	Duluth.
Aug. 27	Str. A. G. Brower	Collided with Str. Ellwood; badly damaged; dry docked at Toledo	Bar Point, Lake Erie.
Aug. 27	Str. Isaac L. Ellwood	Collided with Str. Brower; sunk	Bar Point, Lake Erie.
Aug. —	Str. Bon Ami	Broke shaft; towed to port	Lake Superior.
Aug. —	St. Bge. Jos. L. Hurd	Filled and sank at dock	Sturgeon Bay, Wis.
Aug. 27	Tug Susie B.	Crushed against dock by passing steamers; badly damaged	Ashtabula.
Aug. 28	Str. Gladstone	Aground; released uninjured after lightering	Sandusky.
Aug. —	Str. Geo. W. Peavey	Aground; released	Erie, Pa.
Aug. 29	Str. D. M. Whitney	Grounded on breakwater shoal; released without apparent injury	Buffalo.
Aug. —	Str. Sinaloa	Picked up boulder; dry docked at Lorain	Ashtabula.
Aug. —	Str. Louisiana	Badly damaged in storm; dry docked at Cleveland	Lake Superior.
Aug. —	Sch. Minerva	Grounded; sprung aleak; dry docked at Milwaukee	Sandusky.
Aug. 30	Str. Nyanza	Aground; released apparently uninjured	Marquette, Mich.
Aug. 30	Str. George N. Orr	Ashore in gale	Georgian Bay.
Aug. —	Tug Waldo A. Avery	Broke wheel; repaired at Cleveland	Sandusky, O.
Aug. 31	Str. Rappahannock	Broke rudder	Marquette, Mich.
Sept. 2	Str. Huron City	In collision with Str. Dunham; badly damaged; beached	St. Clair river.
Sept. 2	Str. James S. Dunham	In collision with Str. Huron City; slightly damaged	St. Clair river.
Sept. 3	Str. Mecosta	Somewhat damaged by fire resulting from explosion	Sandusky.
Sept. 5	Bge. Faustin	Ran aground	Detroit river.
Sept. 5	Bge B. B. Buckhout	Sprung aleak; sank at dock	Alpena, Mich.
Sept. 5	Str. Robert R. Rhodes	In collision with Str. Francis Hinton; bow badly damaged; temporary repairs made at Detroit	Detroit river.
Sept. 5	Str. Francis Hinton	In collision with Str. Rhodes; bow badly damaged	Detroit river.
Sept. 5	Str. Edmonton	Ran on rocks in heavy weather; released; badly damaged	Near Brockville, Ont.
Sept. 6	Str. William Edenborn	Struck bridge; uninjured	Duluth.
Sept. 8	Str. Muskegon (formerly Peerless)	Ran on sand bar; released	White Lake.
Sept. 9	Tug Walton B. and scow	Collided with Str. Tionesta; both tug and scow sunk	Duluth.
Sept. 9	Str. Tionesta	Collided with tug Walton B. and scow; uninjured	
Sept. 9	Str. Thomas Cranage	Went aground; released	Pipe Island.
Sept. 9	Bge. George G. Houghton	Sunk in storm	Lake Erie.

AT HEAD OF THE LAKES.

Duluth, Sept. 11.—On Saturday morning the Anchor line steamer Tionesta ran down the tug Walton B. in the channel through the south draw of the Interstate bridge with the result that the tug had to be beached near the Duluth, Missabe & Northern coal dock in St. Louis bay. The Tionesta was uninjured. The cause of the collision seems to have lain in the fact that the tug which was towing a scow up the river should have used the north channel according to instructions from Major Fitch. The Tionesta was down bound from the Superior side to the docks at Duluth. The sunken tug is not in the way of boats.

The new steamer Millinoket, Capt. A. J. Mahon, has been enrolled at Duluth. She arrived here on her first trip last week, and is operated by the Millinokett Steamship Co.

The Ionia Transportation Co. has sued the Lehigh Valley Coal Co. for $2,721 to cover losses sustained by reason of the coal company's refusal to accept a cargo of coal carried by the steamer Ionia from Buffalo to Houghton. The orders of the boat were shifted to Superior and 14 days were lost in unloading at the two ports for which delay and the resulting interference with other contracts the above damage is asked.

The steamer G. Watson French went to the Superior dry dock for repairs last week. Her stay was not long as she has since gotten away from this port with a cargo of ore.

The steamer Edenborn, of the Pittsburg Steamship fleet, collided with the Northern Pacific bridge while coming down from the ore dock. The channel here near the draw is very close to some of the lumber docks and just as the big steamer was entering the draw span the lumber boat Lycoming backed away from the docks directly in the path of the Edenborn, which, to avoid a collision, was forced to reverse its engines causing the stem to hit the bridge. The boat was not injured and the damage to the bridge, though not great, was sufficient to cause a suspension of traffic for several hours.

The steamer Charles A. Eddy, burned last fall, abandoned by the Gilchrist Transportation Co., her owners, towed into port for salvage, bought it again at a sale by her former owners and rebuilt, brought a load of coal to this port last week on the first trip here this season.

The rate on wheat shipments is now 1¾ cents and the following were the receipts and shipments from the head of the lakes during the past week:

	Receipts.	Shipments.
Wheat	181,896	580,405
Corn	.....	.....
Oats	20,064	12,546
Rye	11,064	.....
Barley	150,875	51,650
Flax	28,246	193,125

AROUND THE GREAT LAKES.

It is rumored that the Crosby Transportation Co. and Muskegon business men will build a $1,000,000 ship yard on Muskegon lake.

The whaleback steamer Christopher Columbus made her last trip between Chicago and Milwaukee on Tuesday. She will be laid up at Manitowoc.

The steamer Northwest, of the Northern Steamship Co.'s fleet, has made her last trip to the head of the lakes. She will be laid up at Buffalo.

The steamer A. G. Brower, which was in collision with the steamer Ellwood near Bar Point, will be repaired at Toledo. It will take about two weeks to repair her.

The Canadian steamer Edmonton ran on the rocks near Brockville during thick weather during the night of Sept. 6. She was released on Sept. 10 in a damaged condition.

The owners of the steamer Maryland have filed a libel suit against the steamer Tuscarora for $57,000 for damages at Detroit. The steamers were in collision in St. Clair river about a month ago.

The steamer Huron City, which was aground on Stag island, St. Clair river, has gone to Marine City for repairs. The bow of the boat is badly stove in and repairs will take about ten days.

The American Steel & Wire Co. is operating two ore unloading rigs on the west side of the Cuyahoga river below the Main street bridge. Carriers consigned to the Central Furnaces are unloaded at this dock.

Capt. W. W. Smith, who is superintending the raising of the sunken steamer Ellwood, reports a hole about 24 ft. long and from 2 to 4 ft. wide in the steamer's hold. It will take several days to raise her.

The steamer Gladstone, which was aground on the channel bank near Sandusky for about a week, was released on Tuesday after lightering half of her coal cargo. The steamer was not damaged.

The Manitowoc Dry Dock Co., Manitowoc, Wis., has secured a contract for a sand sucker dredge for the Dahlke-Hansler Co., of Chicago, the contract being for $35,000. The dredge will be 150 ft. long and 10 ft. beam with a 6½-ft. hopper.

The Missabe docks at Duluth made a new record for quick dispatch last week. Twenty cargoes of ore were shipped in twenty-two hours, amounting to about 146,000 tons.

Repairs to the extent of $3,000 have been completed on the steamer John Sherwin at Cleveland. The Sherwin was in collision in the Soo river some days ago.

John Olson and William Ford, two deck hands on the steamer J. E. Davidson, were seriously injured Thursday by the bursting of a water tube. Both were badly scalded, and Olson sustained a fracture on the right knee cap.

Two of the Brown machines on the Ashtabula Dock Co.'s dock at Ashtabula were knocked down by the steamers Nimick and Charles Weston last week. The repair gang of the Lake Shore Railway immediately set to work to replace them.

Col. Charles E. L. B. Davis, district engineer of Detroit, has recommended that the bid of M. Sullivan, of Buffalo, to furnish two dredges and that of G. H. Breymann & Bro., of Toledo, to furnish one dredge for dredging in the lower Detroit river be accepted.

Capt. W. C. Richardson, who recently returned from Buffalo, says that some action should be taken by vessel owners to have a shoal spot at the entrance of Buffalo harbor removed. There is only 18 ft. of water over the shoal and it is causing much trouble.

The Wabash elevator No. 4 located near the middleground at Toledo has been torn down. A few weeks ago the Toledo & Wabash Elevator Co. disposed of the building and property to the Wabash railroad and the site is to be used for the extension of switching tracks.

The steamer Charles A. Eddy, of Gilchrist Transportation Co.'s fleet, is again in commission. The Eddy was abandoned by her owners last fall when she was badly burned on Lake Huron. She was sold by the United States marshal later to satisfy the salvage claim, and was bought back by the Gilchrist Co. She was rebuilt and is now as good as new.

The schooner Santiago which has been on the bottom for several days at Escanaba has been abandoned to the underwriters as a constructive total loss. The vessel was insured for about $55,000. The Santiago arrived at Escanaba last Tuesday week and soon after reaching the ore dock sprung a leak, filling rapidly and going to the bottom. The Santiago was owned by the Boston Coal Dock & Wharf Co. and was operated by Pickands, Mather & Co. She is 324 ft. keel and 45 ft. beam.

TRADE NOTES.

Dean Bros., Indianapolis, Ind., have just issued a post card and description of the Dean Bros. simple pump.

The Joseph Dixon Crucible Co., Jersey City, N. J., has just issued a little catalog descriptive of Dixon's graphite brushes.

The Steel Mill Packing Co., Detroit, Mich., has recently put out a little circular descriptive of its vibrating stuffing box.

On Nov. 1 all the property, plant, accounts and good will of the Toledo White Lead Co. will be sold and transferred to the Hardy Paint & Varnish Co. who will assume all liabilities and collect all accounts of the old company. The new company has increased its capital and the plant and organization will be further improved.

The D. T. Williams Co., Cincinnati, O., announce that their new Hunt street factory was destroyed on the night of Aug. 22 by fire. The company had only moved its lubricating department into the building and this is therefore the only department to suffer. All patterns, however, remain intact at the company's Broadway plant. The company is now installing a new lubricating department at 410-412 East Eighth street and announces deliveries on lubricating devices as of Oct. 15. In all of its other departments the company is in no sense of the word disturbed.

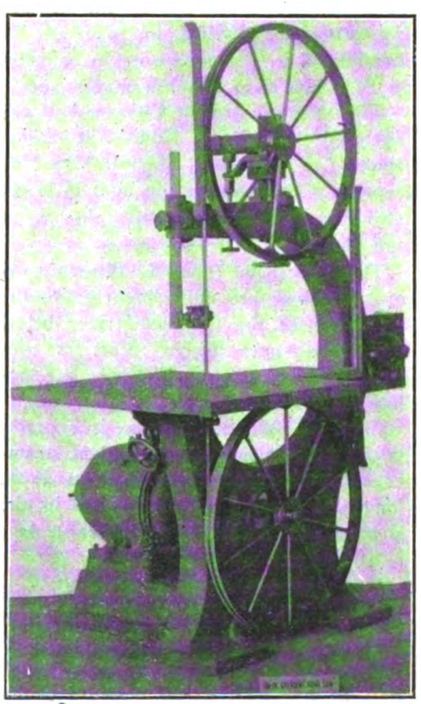
S. Fix's Sons' Steam Flue Welding Works, corner Leonard and Winter streets, Cleveland, have recently added a new warehouse owing to the increase in their business. The company has installed a new machine for straightening tubes out of water-tube boilers and are fully equipped to weld and straighten tubes quite as readily out of this type of boiler as out of the old style boilers. The company is at present welding a large number of tubes for coal mines in Ohio and Pennsylvania, and has just completed a carload of tubes for the Modes-Turner Glass Works at Terre Haute, Ind.

A description of its plant and the process used in treating timber with creosote is published in a brief pamphlet from the Gulfport Creosoting Co., Gulfport, Miss. The plant contains three cylinders, each 7 ft. in diameter, two of them being 120 ft. long each and the third 96 ft. long, their total monthly capacity being 2,000,000 ft. B. M. The timber treated includes piles, telephone poles, bridge timbers, railroad ties, cross arms, conduits, paving blocks and similar classes of material. The specifications recommended by the company for both the timber and the creosote oil are given in detail.

Following catalog No. 70 which was devoted to hydraulic forcing presses the Watson-Stillman Co., Havemeyer building, New York, has issued catalog No. 71 devoted to hydraulic pumps. This replaces old catalog No. 56. About one-half of the catalog represents entirely new matter while other pages represent alterations in the matter or variation in the cuts. The catalog is really a compilation of sheets from the company's general catalog but is very complete in relation to pumps. Especial reference is called to the four-plunger, geared belt pump, being a new form of construction in that it improves on the accessibility of the small parts, while keeping at the same time the strains entirely within direct-tension parts. Attention is also directed to the four plunger duplex geared hydraulic pump which delivers 80 gallons at 30 revolutions per minute at working pressure of 1,000 lbs. per square inch.

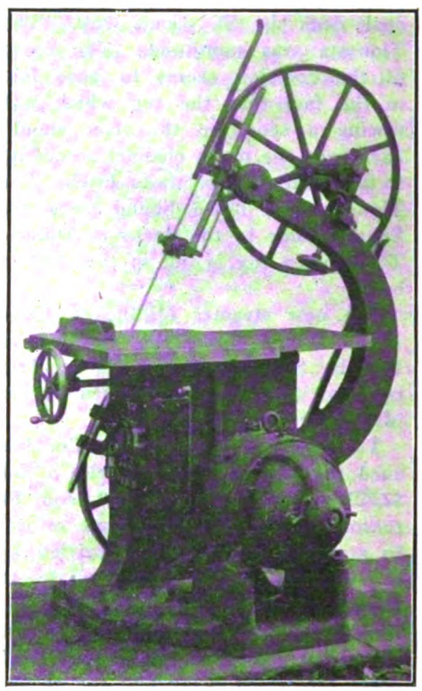
CRESCENT MACHINE CO.

The Crescent Machine Co., Leetonia, O., has recently completed a 38-in. band saw for the New York navy yard. As will be observed in the accompanying photograph, the machine has an electric motor connected direct to the lower shaft making its operation very convenient. The company has also supplied the Portsmouth Navy Yard, Portsmouth, N. H., with an angle band saw equipped with an electric motor similar to the one illustrated herewith.



BAND SAW MACHINE.

The company has now in course of construction a number of motor-driven outfits for private parties. The larger shops all over the country are beginning to realize the economy and satisfaction of individual motor drives for woodworking machines. It is quite apparent that electrically-driven outfits will be more generally used in the future than they have been in the past.



ANGLE BAND SAW.

The United States steamship Charleston is at the Puget Sound navy yard, Bremerton, Wash., having undergone a preliminary survey previous to sending an estimate to Washington as to what repairs are to be made. The recommendations of the steam engineering department will necessitate keeping the Charleston in dock for forty days.

William E. Woodall & Co., Baltimore, Md., have lately commenced repairs on the steamer Louise, owned by the Virginia Navigation Co., Richmond, Va., the vessel having been raised recently from the bottom of the Mattaponai river where she had lain since spring. This steamer was built in Jacksonville, Fla., and is of the Mississippi river type. She is to be rebuilt and put in first-class condition.

ADVERTISERS

The Star indicates alternate insertions, the Dagger once a month.

CLASSIFIED ADVERTISING SERVICE

PROPOSALS.

U. S. Engineer Office, Jones Building, Detroit, Mich., Aug. 26, 1907. Sealed proposals for dredging Section 1, Plan B, Detroit River, will be received here until 3 P. M. October 8, 1907, and then publicly opened. Information furnished on application. Chas. E. L. B. Davis, Col., Engrs.

U. S. Engineer Office, Jones Bldg., Detroit, Mich., August 26, 1907. Sealed proposals for rock and earth excavation, Section 2, Plan B., Detroit River, will be received here until 3 P. M., October 7, 1907, and then publicly opened. Information furnished on application. Chas. E. L. B. Davis, Col., Engrs.

COAL HANDLING MACHINE

ONE BROWN RAPID COAL Handling Machine for sale. Now in use at Toledo Docks. This Machine is in very fair shape and is to be replaced by one of larger capacity. Will be glad to furnish any information to interested parties.

C. B. Duffy, P. A.
Hocking Valley Ry.
Columbus, O.

DIVING OUTFIT FOR SALE

DIVING OUTFIT FOR SALE, IN First-class condition. Address The Cowing Engineering Co., 426 Citizens Bldg., Clevland, Ohio.

BOILERS FOR SALE

TWO MARINE BOILERS for sale, 15 ft. 10 in. diameter, 10 ft. 5 in. long; 4 corrugated furnaces each. Address the Griscom-Spencer Company, 90 West St., New York City.

TWO FIRE BOX BOILERS for sale cheap, 9 feet diameter, 14 feet long, and 1 fore and aft compound engine cylinder 27 and 50, 36 stroke. Address O. G. Donaldson, 202 Main St. Buffalo, N. Y.

PUMP FOR SALE

ONE 100 H. P. ECONOMIC BOILER for sale, new flues, fine condition, also one 65 H. P. Erie City horizontal engine, fair condition. Cleveland MacAdam Company, Builders Exchange, Cleveland, Ohio.

CENTRIFUGAL DREDGE PUMP for sale, No. 10 Van Wie make. Address The Cowing Engineering Co., 426 Citizens Bldg., Cleveland, Ohio.

STEAMERS FOR SALE.

THE LIGHTHOUSE STEAMER Haze, 145 ft. long, 27-ft. beam, 9-ft. draught, 500 tons capacity, 300 horsepower engine and boiler, suitable for passenger or freight business, fully equipped. Steam capstan, donkey boiler. Jacob Ullman, 46 Lloyd street, Buffalo, N. Y.

PASSENGER STEAMER GRANdon for sale, composite build 70 ft. long, 16½ ft. beam, compound engine, independent air pump. Boiler is new 1907, allowed 207 lbs. steam. Equipment is very complete. Also one lighter 100 tons capacity, built of oak, three years old. For information address Henry Freyensee, Sandusky, Ohio.

STEAMER V. SWAIN FOR SALE, coal capacity 1,200 tons. Now lying at Superior, Wisc.

Also Tow Barge Wm. McGregor, coal capacity 1,400 tons. For particulars, address J. E. Sheehan, 970 Fourth Ave., Detroit, Mich.

EXCURSION STEAMER FOR SALE VERY CHEAP, 87 ft. long, 18 ft. 6 in. beam, 7 ft. hold, draws 6 ft. 6 in. water. Engine compound 11½ x 20 x 16. Boiler 100 lbs. Electric lights and Search Light. Everything modern and in good condition. Allowed 215 passengers on route. Capt. F. R. McGregor, 424 Claremont ave., Chicago, Ill.

DREDGING PLANT FOR SALE

A FIRST CLASS DREDGING plant, including scows and dredges for sale or rent. The Central Dredging Company, Cleveland, Ohio.

VESSEL BROKER.

I HAVE VESSELS OF MOST every kind—from 10 tons to 6,000 tons—to sell for their owners, at reasonable prices. Anybody wishing to buy or sell a boat should call on or write Fred A. Bradley,

247 Delaware Ave.,
Buffalo, N. Y.

Bell 'Phone, Tupper 5933.

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NEAFIE & LEVY F & A COMpound 26"-50" x 30" with Surface Condenser and Pumps. Will alter to 22"-50" x 30" for high steam.

13½ K. W. Electric Lighting Set.

Williamson Steering Engine.

Two Hawser Pullers (Capstans).

Two Providence Steam Windlasses.

Wheeler Surface Condenser.

Blake Vertical Duplex Air Pump and Jet Condenser. 7½" steam, 16" air, 12" stroke.

Worthington Duplex Air Pump & Jet Condenser 9" x 12" x 10".

D. C. Sturtevant Blower & Engine.

Two Scotch Boilers 12' x 12'.

Two Scotch Boilers 11' x 12'.

Two Scotch boilers 13½' x 12'.

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154 Nassau Street, New York.

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